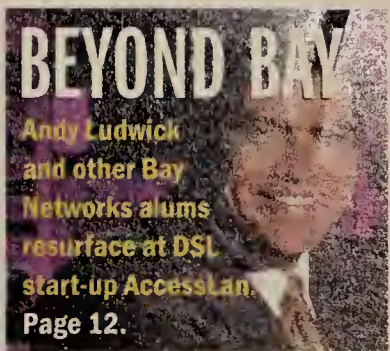


NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

BEYOND BAY
Andy Ludwick
and other Bay
Networks alums
resurface at DSL
start-up AccessLan.
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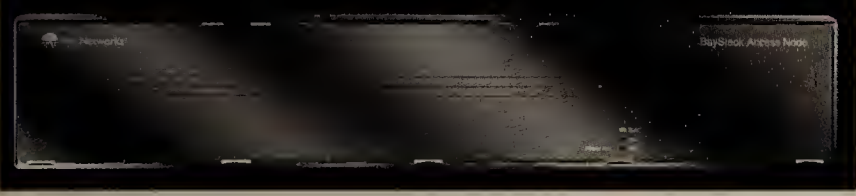


BUYER'S GUIDE
Access routers
Destination: Internet

Dozens of vendors are offering low-end routers targeted for Internet access. Our hands-on tests of seven select models show one — Bay Networks' BayStack Access Node — stands above the crowd, while two others warrant a close look.

If you're like a lot of companies, though, your decision may come down to price, and the Access Node sports a fairly high price tag. You'll find the complete pricing picture and other salient details for 38 access routers in our product charts.

Test results: Page 41
Buying strategies: Page 44
Product charts: Page 45



Rough start for IMAP4

Customers criticize early products based on emerging Internet e-mail standard.

By Paul McNamara

IMAP4 — an emerging Internet e-mail standard that vendors promise will make electronic messaging management easier and safer — is getting a rocky reception in some quarters.

Customers that have tested the first batch of client and server products conforming to Internet Message Access Protocol 4 are not sure these offerings are capable of performing or interoperating as promised.

"We just did a review of the IMAP clients and servers," said Sean Murphy, project director at

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- Overviews of how and why Boston College and Carnegie Mellon University are moving to IMAP

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Emory University in Atlanta. "There's virtually no standardization between them. In fact, they're actually kind of awful."

IMAP4 matters a lot at Nike, Inc., of Beaverton, Ore., where a decision is pending on whether to install a standards-based messaging backbone.

"My experience thus far is that all IMAP4 clients do not function completely with disparate servers," said Kevin Lee, a senior LAN engineer who recently tested a variety of IMAP4-enabled products. "The technology itself is great, but interoperability isn't there yet."

Such assessments are vehemently disputed by vendors such as Netscape Communications Corp., which recently began

See IMAP4, page 57

CA buys its way into PC mgmt.

By Jim Duffy
New Orleans

In an effort to shore up its desktop management offerings, Computer Associates International, Inc. (CA) this week is expected to announce its acquisition of Denmark's CapaCity Software A/S.

Obtaining CapaCity's NetCon technology will enable CA to strengthen the limited desktop asset management capabilities of its Unicenter/TNG enterprise manager. CA also plans to integrate NetCon with CA's current server asset management products to provide customers with a more comprehensive management package.

CA and CapaCity privately confirmed the deal, which may

See CapaCity, page 56

PROFILE: CAPACITY SOFTWARE A/S
Headquarters: Berlin, Mass.
Fredensborg, Denmark
Founded: 1989
Management (U.S.): Ron Corriveau, president
Products: NetCon System Management Suite, software for automated PC system management
Employees: 60
Revenue: Undisclosed; privately held

Mars: 2400 baud away

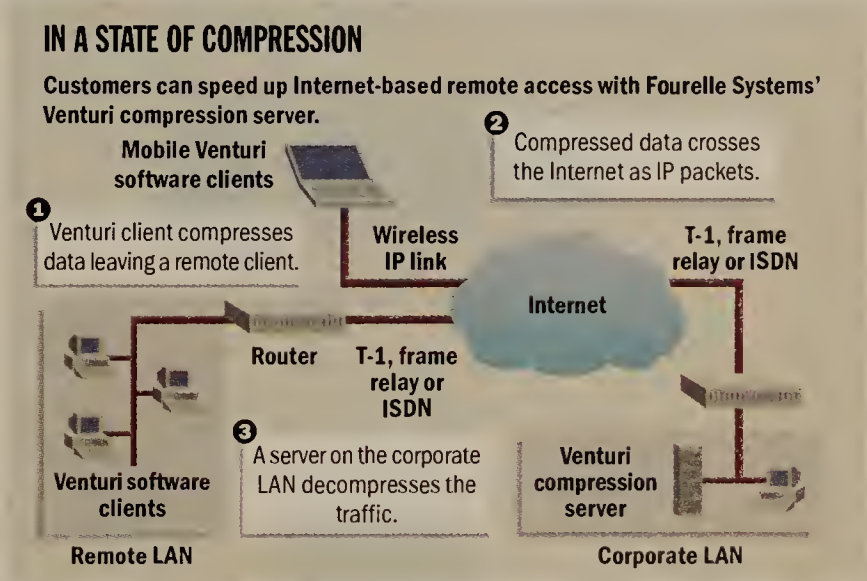
By Todd Wallack
Pasadena, Calif.

For the past week, the nation has been entranced by panoramic pictures of the dusty, red Martian surface and alien rocks called Yogi and Barnacle Bill.

But network professionals might be surprised at how basic the communications devices are that relay those pictures 120 million miles to Earth.

It turns out the heart of the telecommunications system relaying messages from the mechanical Sojourner rover to the fixed Pathfinder lander is a pair of modified Motorola 9600 baud wireless modems transmitting at about 2400 baud. These are nearly the same type of modem you could buy for less than

See Mars, page 56



Squeeze your 'Net links

Capacity doubled on remote access Internet connections.

By Tim Greene
Santa Clara, Calif.

A new data compression system from start-up Fourelle Systems, Inc. promises to double the capacity of Internet links for customers who use the 'Net as a remote access backbone.

The company's Venturi system employs a feature called Intelligent Compression to determine what combination of algorithms would best compress different file types. For example, the system knows a data file would get different treatment than a video clip.

Venturi includes a hardware compression server that sits on the corporate site and software that runs on remote Windows 95, NT Workstation and 3.1 clients. The company said the system offers better throughput than software-only compression, which relies on host power to perform compression and decompression.

With Venturi, when a remote user contacts the corporate net via the Internet to access an application or use e-mail, the user's IP traffic is compressed by the Venturi client on the user's Windows PC or laptop. The compressed IP traffic crosses the Internet and is decompressed by

See Fourelle, page 56

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JAVA MEETS MARS
Everyday Internet users can simulate rover missions with the same Java applet being used by scientists. **Page 33.**



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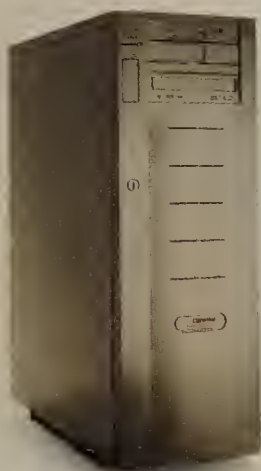
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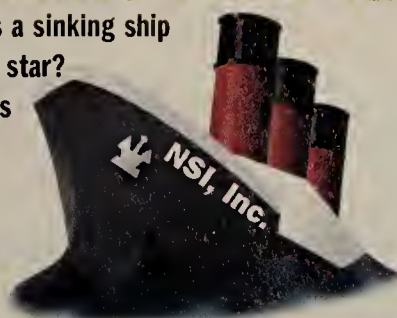


THE BOOK ON OBJECTS

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THAT SINKING FEELING

Is Network Solutions a sinking ship or rising Wall Street star? Only 'Net Buzz knows for sure. Page 58.



JAVASOFT'S KANNEGAARD

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Be a NET KNOW-IT-ALL

For the answer to this week's question and more net trivia, visit Network World Fusion and enter 2349 in the DocFinder box.



This week's question:

Apple Computer last week ousted Chairman and CEO Gil Amelio. Who was chairman before Amelio?



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This Week

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New feature. Confused by all the acronyms? Want more info on the buzzwords? Starting this week, articles on Fusion will have built-in definitions of key terms.

As you read our articles or hyperlink lists, you'll find highlighted words. Click on them to bring up definitions from our Know Zone networking dictionary. Many of the definitions also will have further links to more in-depth information, such as primers and FAQs.

Electronic commerce. European and U.S. officials trying to develop common strategies on electronic commerce remain split on the key issue of encryption. **DocFinder: 2922**

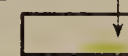
From the front page

Interplanetary Area Networks. We just can't get enough of those pictures from Mars. But what must it be like to actually walk on the Red Planet? We've taken some of the images and turned them into QuickTime virtual reality loops so you can take a virtual tour of Yogi, the Twin Peaks and all the other rocks. Just don't move your cursor too quickly — you don't want to get dizzy! **DocFinder: 2920**

Data Compression. Read our story about a new way to cut WAN costs via compression, then come online for a detailed primer on compression. **DocFinder: 2921**

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News briefs, July 14, 1997

SunNet Manager on the ropes?

■ Reports surfaced last week that IBM's Tivoli Systems, Inc. subsidiary and Sun Microsystems, Inc. are close to unveiling Corona, a Java-based version of Tivoli's TME network and systems management framework. Corona reportedly will include Sun's SunNet Manager technology as its network management component, and some analysts even speculate Sun will wash its hands of SunNet Manager by handing over ongoing development to Tivoli. That will enable Sun to focus its network management efforts squarely on the telecommunications market with the Solstice Enterprise Manager system, the analysts said. Sun and Tivoli declined to comment. An announcement could come this week, possibly tomorrow, when Scott McNealy, Sun's CEO, speaks at a Computer Associates International, Inc. conference in New Orleans.

Bruised Apple

■ Apple Computer, Inc.'s woes continue to mount. CEO Gil Amelio, who ran the company since 1994, and Ellen Hancock, executive vice president of advanced technology, resigned last week in the wake of Apple's continuing poor financial performance. In addition, many Apple board members were unhappy with Amelio's handling of the struggling computer maker. Analyst consensus was that instability at the top of Apple's chain of command would only further the firm's downward spiral.

Steve Jobs, one of Apple's founders, will have an expanded role in the company, focusing on product strategy, marketing and sales strategy and business partnerships, a company official said. However, Apple officials would not speculate about whether Jobs was considering taking the CEO slot. The announcement comes as the company is preparing for the release of its feature-rich MacOS 8 at the end of this month.



Amelio



Hancock

Management in the Big Easy

■ Internet management will be the talk of the town in New Orleans this week as Computer Associates International, Inc. announces partnerships with Hewlett-Packard Co. and Exodus Communications. At the CA-World conference, CA and HP are expected to announce that CA's Unicenter/TNG will run on and manage HP's NetServer line of Intel-based Internet and intranet servers. Meanwhile, CA and Exodus are allying to develop an enterprise management system for the Internet.

High-speed token ring picks up speed

■ Last week, the IEEE 802.5 committee decided to support the initiative to investigate high-speed token-ring options. Currently, token ring runs at a maximum of 16M bit/sec, which many users find insufficient for server links, industry observers said. Right now, the only way for token-ring customers to boost bandwidth to the server is by using ATM or FDDI links. But that may soon change if the IEEE committee adopts a faster version of token ring.

Intranets and extranets

■ PSINet, Inc. this week plans to announce global availability of its IntraNet service this week and support for extranets. IntraNet's new extranet feature lets customers add business partners or clients to their intranets.

All IntraNet user traffic travels over PSINet's frame relay network. Each user's IntraNet and extranet is set up using frame relay permanent virtual circuits and 128-bit key encryption technology, according to Tony Kelly, vice president of marketing at the Herndon, Va.-based Internet service provider. IntraNet service rates range from \$495 to \$2,895 per month for each 56K bit/sec to T-1 (1.544M bit/sec) dedicated connection.

McAfee throws water on hostile applets

Desktop software to screen out 100 harmful ActiveX and Java programs.

By Ellen Messmer
Santa Clara, Calif.

Next month, McAfee Software will ship WebScanX, desktop software that filters out 100 hostile ActiveX and Java applets before they can do damage.

WebScanX, which works with Netscape Communications Corp. Navigator 4.0 and Microsoft Corp. Internet Explorer 4.0, can scan for 70 ActiveX controls and 30 Java applets that McAfee said are known to be disruptive.

These applets can be nasty. "There's an ActiveX control based on Microsoft Exchange that can look in your e-mail directory and send an obscene message in your name to people listed in the directory," said McAfee General Manager Zach Nelson.

"And there are Java applets that can blow up your browser by opening a lot of Windows in [the] background, devouring system resources," Nelson said.

An ActiveX control recently downloaded via File Transfer Protocol off the Internet managed to format a disk at Norris-

town, Pa.-based consultancy Productivity Solutions, Inc., and wipe out its contents.

"I'm not sure who downloaded it, whether it was one of our people or even a client," said David Moskowitz, the company's president.

ActiveX controls essentially can do anything Windows applications can do, according to Moskowitz.

"ActiveX is much more dangerous than Java applets" because it lacks some of the security controls in Java, he added.



WebScanX desktop software lets you shoot down hostile ActiveX or Java applets.

Is it safe?

Moskowitz doubted whether trying to keep a running catalog of malicious ActiveX controls would supply adequate protection, when the real problem simply was the lack of a good security architecture in ActiveX.

Anyone interested in creating malicious ActiveX controls could work around any known filters identifying specific applets, Moskowitz said.

"ActiveX controls could be combined and become malicious, even though they weren't obviously malicious separately," he added.

Another drawback to WebScanX is that it creates a time lag for running applets.

WebScanX software captures every ActiveX and Java applet it encounters and scans it, a process that naturally causes delays for users, Nelson said.

WebScanX will cost \$80 per desktop for subscription updates as part of McAfee's Virus Scan Security Suite, or it can be purchased separately for \$39.

© McAfee: (408) 988-3832

Internetworks

New Bay workgroup switch paves path to ATM backbones

By Jim Duffy

Santa Clara, Calif.

Bay Networks, Inc. next week will announce a new Ethernet-to-ATM workgroup switch for Ethernet users migrating to ATM backbones.

The Centillion 50N (C50N) sports two full-duplex OC-3 ATM switch ports, 16 10Base-T Ethernet switch ports and one expansion slot. The expansion slot can support any of Bay's existing Centillion 100 host switching modules.

The C50N is designed to go into wiring closets to provide switched 10M bit/sec connectivity among Ethernet hubs as well as redundant, high-speed ATM connectivity to backbone switches.

It is aimed at enterprises look-

ing to evolve their shared Ethernet infrastructures gradually to switched Ethernet and ATM, Bay said.

The C50N is based on the same architecture as Bay's higher end C100 and System 5000BH wiring closet and backbone LAN/ATM switches.

The dual OC-3 ATM ports on the C50N offer multiple and redundant load-sharing capabilities.

If a link fails, traffic is diverted to the redundant link, similar to the dual-ring functionality of FDDI networks, Bay said.

The C50N supports a suite of ATM protocols, such as User-to-Network Interface 3.1 signaling, LAN Emulation 1.0 and the Interim Interswitch Signaling Protocol.

It also will support the IP Multicast and Layer 3 switching services being developed for the C100 and System 5000BH.

The C50N costs \$9,995 and will ship this month.

Price too high?

The price, however, may be the C50N's downside, analysts said.

"We're seeing more commodity Ethernet switches down in the sub-\$100 per-port range," said David Passmore, president of consultancy Decisys, Inc. in Herndon, Va.

"Other vendors have simply sold an Ethernet switch where they tack on an ATM daughterboard to give you those ATM links, and the pricing is considerably less than [the C50N]. [Bay] may have a bit of a time convincing people that [the C50N is] a good value, especially since a lot of people are not necessarily sold on the concept of needing an ATM backbone in the campus," Passmore said. ■

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Java 'class' warfare leaves developers in lurch

By Ellen Messmer
and Carol Sliwa

Writing software in Java is supposed to be easy. But Microsoft Corp.'s recent snub of Sun Microsystems, Inc. technical changes is making things dicey for Java developers.

Sun's JavaSoft division last week unveiled the developer release of the Java Foundation Classes (JFC), the latest graphics and network services class libraries that are supposed to go into Java-based tool kits, applications and browsers. The JFCs were developed jointly by Sun, Netscape Communications Corp., IBM and Apple Computer, Inc. and will be supported by Netscape browsers.

But Microsoft said it will ship only its own set of Java class libraries, called the Application Foundation Classes (AFC), with its new Internet Explorer 4.0 browser. Class libraries are chunks of reusable code that can be used to ease development of applications.

Caught in the crossfire, thousands of Java developers are being forced to choose between Microsoft's AFCs and Sun's JFCs—or use them both.

For network managers, the sad result may well be that applets or applications written to Microsoft's AFCs will not work with Netscape browsers—unless those AFCs have been explicitly downloaded onto the local machine.

And because Microsoft has no

plans to ship JFCs with Internet Explorer 4.0, users will have to download all of the JFCs to be able to run an application written the Sun way, said Scot Wingo, cofounder of Morrisville, N.C.-based toolmaker Stingray Software, Inc.

That could be one big hassle for corporations. They may want

to run applications written with only Sun's JFCs or Microsoft's AFCs, but they cannot control what trading partners or consumers on the Internet will do.

"We are seeing the balkanization of Java," said John Rymer, vice president at Cambridge, Mass.-based consultancy Giga Information Group, Inc. "As the definition of

Java expands, the original vision of Java as the ultimate open system is beginning to die."

Sun still has a glimmer of hope. "We're still hoping Microsoft will come along," said Jon Kannegaard, vice president of software products at Sun's JavaSoft unit, which licenses Java to the industry.

The Microsoft way

But Microsoft clearly believes AFCs are the way to go.

"AFC gives Java developers the best way to quickly develop modern-looking applications. For example, you can develop a tool bar with two lines of code," said Tom Johnston, a Microsoft group product manager.

Developers are not as enthusiastic. "Our hope was by now we wouldn't be dealing with these

differences," said Barry Burke, vice president of marketing at Applix, Inc., which markets the Anywhere line of Java applications. "Microsoft is taking everything in a different direction. We're playing the typical Microsoft game: If you don't like it, change it."

Burke said Applix later this year will have to make a decision about whether to support the Sun or Microsoft approach because it would be too costly to try to build products based on both.

However, Stingray Software plans to support the JFCs and the AFCs. "But we still think Microsoft will win," Wingo said. "Everyone's so concerned about cross-platform, but when you look at the platforms that applications developers target, the overwhelming majority target Windows, and Microsoft controls that."

Wingo said at this point the AFCs look more polished than the JFCs. However, both sets of class libraries are still in the early

stages and undoubtedly will undergo changes.

Last week, at least one developer was close to outrage over Microsoft's snubbing of the JFCs.

If Microsoft does not support the full range of JFCs, "there will be too many things on the Internet that would not work," said Nicko van Someren, chief technology officer at nCipher, Ltd. of Cambridge, England. "Microsoft would like everyone to be stuck with Microsoft operating systems, so they've presented this API. They're trying to lock people in, and I don't think the application-writing people will buy it." ■



"We have an open invitation to Microsoft to help us with these JFCs," says JavaSoft's Jon Kannegaard.

Security

Bell Labs spots security flaw in JavaScript

By Ellen Messmer
and Carol Sliwa
Murray Hill, N.J.

Bell Labs has discovered a security flaw in JavaScript, supported in Microsoft Corp. and Netscape Communications Corp. browsers, which lets an attacker observe data viewed or transmitted through the browser.

Bell Labs researcher Vinod Anupam said the JavaScript weakness lets an attacker easily download a Trojan horse—code that lies waiting to exploit a vulnerability—into the victim's browser by including the malicious code on a Web page the user might view.

Once the code is embedded, the attacker can observe the user's future activities, be it visiting URLs, filling out forms or passwords, or even transmitting encrypted credit card numbers.

"Even whatever is stored in

the cookie is up for grabs, although it's only supposed to be available to the site that sent it," Anupam said. He noted that when users shut down their browsers, the JavaScript-based Trojan horse goes away.

The Trojan horse attack is easy to craft, Anupam said. The browser's JavaScript can be infected simply by visiting the Web page once. The Computer Emergency Task Force, which operates from Carnegie Mellon University in Pittsburgh, has issued a security advisory on the problem, recommending that users turn off the JavaScript feature in their browsers.

Netscape last week released a fix for its Navigator 3.02 browser, which can be downloaded from the company's Web site. The company also is planning to issue a fix for its new Communicator product this week, according to David Rothschild, Netscape's

director of client product marketing.

Microsoft has posted information on its Web site to alert users about the problem. Only users of Microsoft's Internet Explorer 3.X and 4.0 platform preview browsers on Windows 95 and Windows NT are affected. The company plans to make a fix available for Internet Explorer 3.02 users this week or early next week, according to a Microsoft spokeswoman.

The 4.0 fix will be incorporated into Preview 2, which is expected to be available this month, she said.

In the meantime, concerned users can turn off the JavaScript capability in Internet Explorer by going to the "View" menu item, selecting "Options," going to the "Security" tab and unchecking the "run ActiveX scripts" box, the Microsoft spokeswoman said. ■

IBM launches Java-based workgroup manager

Windows NT-based package promises real-time network management.

By Marc Songini
Raleigh, N.C.

IBM hopes its new Java-based workgroup manager puts the company ahead of the Web-based management pack.

The company's Nways Workgroup Manager for Windows NT will let administrators more easily manage networks based on IBM's 8210 Nways Multiprotocol Switched Services (MSS) server, the IBM 8273 Nways Ethernet RouteSwitch and other multi-vendor hardware.

Using any industry-standard

Web browser or local NT workstation, network managers can monitor network switches and perform a variety of management tasks, such as adding and deleting devices, reconfiguring the network and enabling or disabling switch ports.

Aimed at small-to-midsize networks, Workgroup runs on Windows NT 4.0 and can support a system with as many as 200 nodes. IBM said it will expand its Java-based management products to its larger campus and enterprise switches in the future.

Java-based Workgroup applets on the Windows NT server gather real-time data from SNMP Management Information Bases on the 8210, 8273 or other SNMP-capable devices. Administrators with Web browsers then can download those applets and have full view of their workgroup environment. They can issue commands to specific devices in the workgroup should a problem arise.

On the cost side, IBM claims the suite will cut down the need for centralized management ser-

vers and specialized consoles. It also will reduce network traffic and the amount of administrator training needed. Ultimately, this will result in lower network ownership cost, while at the same time improving efficiency, IBM said.

"Now you have the capability to use a Web browser to gain access to the network, and you can do it from anywhere," said Greg Marrow, brand manager for Nways products.

Systems administrators may be intrigued by Workgroup. Jerry Wetherington, systems coordinator for the Northeast Regional Data Center at the University of Florida in Gainesville, said, "Users have been asking for

this [configuration] for a while, and I don't know of any other vendor who's doing it."

On the other hand, analyst Tom Nolle, president of CIMI Corp. in Vorhees, N.J., said, "In my opinion, it doesn't solve any problem that needs solving."

"Management professionals will make sage comments about Workgroup, then the users will yawn, and that will be the end of it," Nolle added.

IBM joins Cisco Systems, Inc. and Hewlett-Packard Co. in the Web-based management arena (NW, June 23, page 1).

Nways Workgroup Manager for Windows NT is currently available and costs \$2,795.

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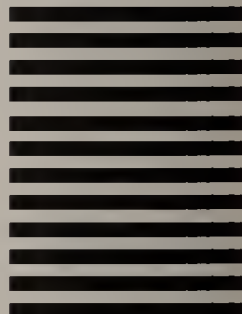
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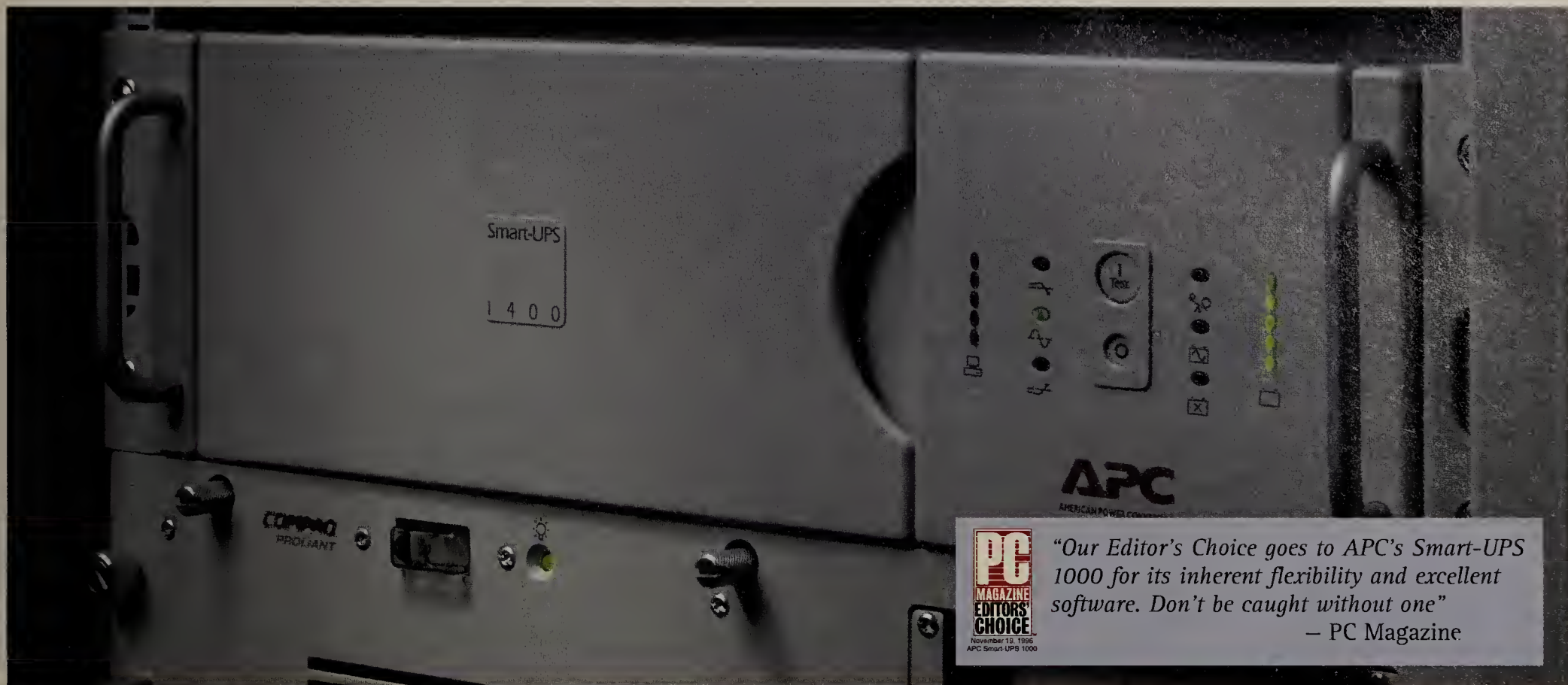
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The Internet to the switched telephone network: Move over

Faxing over the Internet is the latest popular ISP service.

By Denise Pappalardo

As expected, UUNET Technologies jumped on the fax-over-the-Internet bandwagon last week with a new fax service that promises to substantially cut user fax costs (NW, July 7, page 6).

UUFax will let users send faxes around the world over UUNET's IP network from a PC or traditional fax machine.

The Internet service provider claims the fax service will cut users' fax costs by 35% to 55% compared to the use of traditional telephone nets.

network, avoiding public peering points that are sometimes blamed for Internet slowdowns. Both ISPs claim keeping the fax traffic confined to their own networks will beef up the services' reliability.

UUNET is using Harmony fax servers from Open Port Technology, Inc.

Ascend Communications, Inc., UUNET's primary hardware vendor, also worked with Open Port to ensure interoperability between Ascend MAX devices and the fax servers.

UUFax is expected to offer PC-to-fax, PC-to-e-mail, PC-to-PC and fax-to-fax transmission support when the service is available later this year.

UUNET plans to deploy 100 fax servers throughout its 1,000 points of presence domestically and internationally, said John Sidgmore, CEO at UUNET and vice chairman and chief operating officer at WorldCom.

Final pricing will be announced in the

fourth quarter when the service is slated to be available.

In addition to onetime hardware costs that have not been released, users will pay recurring monthly usage fees. Tentative recurring pricing is set at 10 cents per minute domestically and 19 cents per minute from the U.S. to Europe.

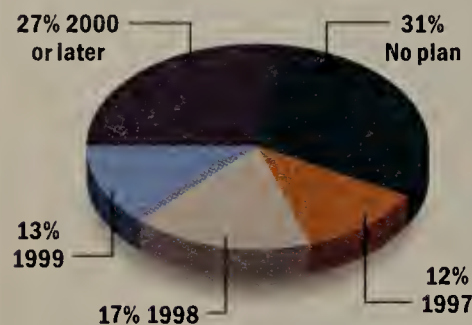
UUFax domestic service pricing may not seem too compelling, but there are management features included in the client software that may make a case for some users, according to The Yankee Group's Bartlett.

Internet Paper and UUFax include client software that lets users track the status of their fax transmissions.

Internet Mobility Corp., a software development company, likes the idea of sending faxes over the Internet, not for its cost-savings potential, but for its ease of use, said Cindy Grilli, controller at the Herndon, Va.-based company.

"I don't even remember the pricing, but we do a bit of faxing here so convenience is more important," she said. ■

WHEN DO YOU ANTICIPATE USING THE 'NET FOR VOICE OR FAX?



Based on a survey of 52 telecommunications managers at large companies.

SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

But UUNET, a subsidiary of WorldCom, Inc., is not the first to offer a fax service.

PSINet, Inc. introduced its Internet Paper service late last year and announced global support for the service last month (NW, June 23, page 8). PSINet has deployed NetCentric Corp.'s FaxStorm 1.0 servers to support fax traffic over its IP network.

And NetCentric also is not standing still in the fax market. The company is expected to announce Fax Storm 2.0 this week, which will include Windows NT support as well as fax-to-fax transmission support over the Internet.

Currently, Internet Paper is limited to PC-to-fax and PC-to-PC transmissions.

Fax and eventually voice over the Internet will become standard bundled service offerings from ISPs, said Joe Bartlett, program manager at The Yankee Group, a Boston-based consultancy. PSINet and UUNET have just made it to the gate first, he said.

Like PSINet, UUNET's UUFax service will travel over its own

3Com, Siemens agree to develop products to link voice, data nets

Development deal expected to marry new PBX platform to 3Com's fast IP.

By David Rohde
Santa Clara, Calif.

The nation's second-largest internetwork company and third-largest PBX vendor last week announced an agreement to develop new products for integrating voice and data networks.

The deal between 3Com Corp. and Siemens AG also will expand the companies' existing global agreement to distribute each other's products.

Although analysts said the deal should shore up weaknesses in both companies' channels, they adopted a wait-and-see approach on the firms' ability to marry PBX, LAN and WAN infrastructures.

Officials from both companies said they were not prepared to announce specific product directions.

"But our vision is to create a single switching fabric — based on packets, cells or a mix of both — that transports voice and data together," said 3Com CEO Eric Benhamou.

Among the possibilities they raised were a LAN server link plus software upgrade to Siemens' Hicom 300E PBX to provide call-control features such as hold, transfer and conference to Ethernet traffic streams.

The idea would be to enhance 3Com's Fast IP Layer 3 switching scheme, which is designed to provide a cut-through path for real-time traffic to better support voice and video sessions.

Partnerships everywhere

The 3Com-Siemens agreement helps fill out a matrix of distribution and product development partnerships between major PBX companies and leading internetwork vendors, excluding Cisco Systems, Inc. (see graphic).

The agreements generally are nonexclusive, and for its part, Cisco does distribute some of its products through the major PBX vendors' sales channels, said Allan Sulkin, president of TEQConsult Group, Inc., a consultancy in Hackensack, N.J.

The 3Com-Siemens deal is similar to one between Lucent Technologies, Inc. and Bay Networks, Inc. in terms of the tech-

nology transfer and distribution agreements, said Esmerelda Silva, an analyst at International Data Corp., a market research firm in Framingham, Mass. "But 3Com and Siemens are promising to deliver [new] product within the year, which is somewhat different," Silva said. She suggested that 3Com and Siemens may start by developing a frame relay access device supporting voice traffic.

But not all customers of Siemens' U.S. unit, known as Siemens Business Communications Systems, Inc., may be able to benefit immediately from the new partnership's development work.

Though widely installed in Europe, the Hicom 300E PBX only now is being introduced in the U.S. (NW, June 23, page 31). However, certain models of the company's former flagship PBX, the 975I Computerized Branch Exchange, can be upgraded to the Hicom platform without changing out entire cabinets.

Siemens forged the 3Com alliance partly because its U.S. growth rate is falling behind that of PBX rivals Lucent and Northern Telecom, Inc., Sulkin said.

Siemens is less than halfway toward a goal of reaching \$2 billion in U.S. revenue by the year 2000, "and they're not going to get there selling more PBXs," he said.

For its part, 3Com needs more European marketing muscle to match Cisco's sales surge there, Sulkin said. Siemens is a

JOINING FORCES

The three largest PBX manufacturers now have partnerships with three of the largest internetwork vendors:

PBX vendor	Partner
Lucent	Bay
Nortel	Cabletron
Siemens	3Com

dominant vendor of voice equipment in Germany and other European countries.

Users said they are examining voice-data convergence in hopes of saving money.

"That would be great for me because then you just have one network and one set of people to maintain it," said 3Com customer Mike Bannon, manager of communications at Mercy Health System of Southeastern Pennsylvania, a non-profit health care company based in Bala Cynwyd, Pa. ■

3Com to shed 800 employees

3Com Corp. has announced it will lay off about 800 people as a result of its merger with U.S. Robotics (USR), which was completed last month.

3Com will probably eliminate about 600 permanent jobs over the next 12 months, as well as 200 temporary positions, according to Robert Ingols, the company's public relations director. He claimed the layoffs will have little or no effect on customers.

Ingols would not comment specifically on which jobs will be eliminated, except to say they will occur in areas of redundancy. "For example, where you have two [chief financial officers], two investor relations departments and things like that," he said.

The layoffs come despite claims from 3Com and USR officials at the time the merger was announced that there was little overlap between the two companies.

"There was only a 2% to 3% overlap between the two companies' products, and so we don't have overlap of engineering talent," Ingols said. "This is just a matter of combining two companies and moving forward at rapid speed to get products to market."

—Jodi Cohen

Web group expects quick action on HTML update

Version 4.0 should get stamp of approval from W3C, will include enhancements in page forms, frames and tables.

By Chris Nerney and Carol Silwa

The lead architect of the latest proposed version of the text language used to create Web pages expects an HTML 4.0 standard by year-end.

"Microsoft [Corp.] and Netscape [Communications Corp.] are both committed to supporting it," said Dave Raggett of the World Wide Web Consortium (W3C), the industry group that defines and enhances Web technical standards. Raggett said public review of the draft likely will only take a few months.

"We expect some discussion about the details, but no major disagreements," he said. "We've been working on this for the past three years."

W3C officials said HTML 4.0 builds on the multimedia and hypertext features included in HTML 3.2, which the consortium recommended as a standard in January.

HTML 4.0 includes enhancements in page forms, frames, tables, script and style elements (see graphic). Raggett said support of style sheets is a particularly important element of the latest draft.

"What we're saying with HTML 4.0 is that style sheets are the way to go," he said. "They'll reduce the costs of developing great-looking Web pages and give you much greater control."

WHAT TO EXPECT IN HTML 4.0

- **Advanced forms** — For creating more controls, grouping form controls and adding labels to controls.
- **Frame improvements** — For placing frames in HTML documents.
- **Table enhancements** — For adding column groupings and more precise table borders.
- **Object support, script and style elements** — For embedding objects and scripts into documents and supporting style sheets.
- **Additional named entities** — For supporting symbols and glyphs used in mathematics and some non-English languages.

Style sheets determine how Web documents are presented. Attaching style sheets to HTML pages allows authors and readers to alter document presentation without adding new HTML tags.

Netscape said many elements of HTML 4.0 already are shipping in its Communicator 4.0 client, which was released last month.

Eric Byunn, Netscape senior product manager, said the company expects to have "most, if not all" of HTML 4.0 in its next browser, but he declined to provide specifics about the timetable for full support.

Among the major HTML 4.0 elements Netscape already supports are style

sheets, frames, forms and scripts.

"I know there are some things that are within the individual detail level that we

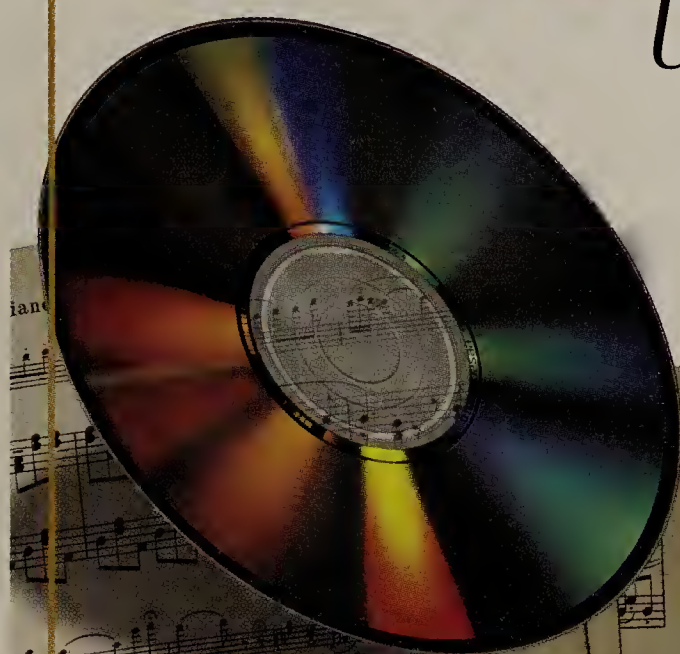
aren't quite supporting yet, but there's no major area that we're not supporting," Byunn said.

Microsoft last week said it would support "99%" of the HTML 4.0 working draft in the second "preview" version of its Internet Explorer 4.0 browser due out this month.

Microsoft Product Manager Christine Chang said there are only one or two "obscure elements" that will not be included in the upcoming beta. ■

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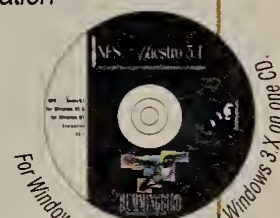
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Netscape server update brings packaging, pricing changes

By Carol Silwa

Mountain View, Calif.

Only a month after the much-heralded release of its SuiteSpot 3.0 servers, Netscape Communications Corp. is throwing in new features and changing the software's packaging and pricing scheme.

The software maker now plans to offer two versions of SuiteSpot:

- A Standard Edition, comprising the Enterprise, Messaging, Collabra and Directory servers as well as a new Calendar offering.

- A Professional Edition, which includes all of the Standard Edition servers plus the Proxy, Certificate and new Compass servers, as well as a Mission Control client management tool.

While the new packaging may simplify decision making for those buying into Netscape's messaging/collaboration offering, it will not matter much to the many customers whose primary interest lies in Netscape's popu-

lar Enterprise Webserver.

Take Harris Corp. of Melbourne, Fla., for example. The electronics communications equipment maker uses only Netscape's Enterprise Server and is considering adding the company's Proxy and Certificate servers.

ies, not just Netscape, recognize that there are environments where people will not be doing very rigorous collaborative work," Olguin said.

As a user only of Netscape's Enterprise Web server, Olguin has little interest in Netscape's continued move to per-user pricing.

NETSCAPE'S NEW PRICING SCHEME

SuiteSpot 3.1 offering	50-user price	100-user price
Standard Edition	\$3,495 (\$70 per user)	\$6,500 (\$65 per user)
Professional Edition	\$4,750 (\$95 per user)	\$9,000 (\$90 per user)
SuiteSpot Standard Edition/Communicator enterprise package	Not Applicable	\$9,200 (\$92 per user)

Harris has no plans to use the collaborative products because it uses internally developed utilities for team collaboration and is standardized on Microsoft Corp. messaging products, according to Sheryl Olguin, a software engineer with Harris' Electronic Systems Sector.

"I would like to see all compa-

ing. "That kind of pricing makes it extremely difficult," she said, noting that her company likes the old SuiteSpot model.

Under the old plan, customers could bundle any combination of five Netscape servers for \$4,995. Now a 50-user Standard Edition will sell for \$3,495, and a 50-user Professional Edition will

cost \$4,750. Prices decrease as customers buy in bulk.

Companies like Harris might be inclined to buy servers a la carte. The Enterprise, Messaging, Compass and Calendar servers are each priced at \$1,295, and the Proxy, Collabra and Certificate servers cost \$525. But for those interested in Netscape's collaboration products, the new packaging will be helpful, analysts predicted.

"The [new packaging] simplifies the pricing algorithm, which is going to make it easier for people to buy and choose SuiteSpot solutions," said Geoffrey Bock, a senior analyst with Boston-based consultancy Patricia Seybold Group, Inc.

On the server side, there now will be eight SuiteSpot servers instead of nine. Gone is the Media Server, which now will come bundled with the Enterprise Server. Compass Server, which replaces the Catalog Server, is intended to help customers organize and manage the flood of information from intranets and the Internet through the use of personal profile and search tools.

Netscape's Directory Server, which the company touted as the key to managing its whole product line, will now come free with any server purchase.

It may look like Bay, but it's not

By Tim Greene

San Jose, Calif.

Look around the headquarters of digital subscriber line (DSL) start-up AccessLan Communications, Inc. and you might think you were in a time warp back to the early days at Bay Networks, Inc.

Former Bay President and CEO Andy Ludwick is presiding as chairman of the board, riding herd on former Bay all-stars.

But those onetime Bay staffers, with backgrounds in LAN switching and routing, now find

themselves focused on wide-area DSL technology that supports multimegabit traffic over standard copper phone lines.

That is an area in which Bay has not exactly been blazing trails. While they are very hush-hush about what exactly they are up to, there are hints that they are working on a model no other DSL vendor has talked about.

The SONET way

Alan Menezes, vice president of marketing, is one of the few top managers at AccessLan who never worked at Bay. Menezes said the company is not wed to the popular DSL network architecture that has ATM traffic ride the asymmetric DSL (ADSL) link. "ATM to the desktop is not successful, and people are rethinking it. IP over SONET [Synchronous Optical Network] is an interesting direction as an alternative to ATM," Menezes said.

Under that scenario,

the ADSL user would send IP traffic over the ADSL line and not have to worry about packaging it in ATM cells. That would eliminate the possible need to install ATM network interface cards in customer gear and would make for simpler, less-expensive customer-end ADSL modems.

Dropping IP directly onto a SONET fiber backbone would also eliminate ATM overhead that eats up bandwidth, something that might interest service providers. Like all DSL start-ups, AccessLan is trying to woo carriers, the players who will dictate when, where and how widely DSL services will be available.

AccessLan is focused on developing gear that will support ADSL use by corporate accounts as opposed to residential use. The company has in the works a router with a DSL modem to support LAN-to-LAN links, telecommuting and Internet access, Menezes said.

On the carrier side of the ADSL line, AccessLan is working on a multiplexer that can sup-

port as few as 20 lines but scale to thousands. While noting the merits of SONET, Menezes also pointed out, "ATM is solid in the carrier backbone."

The company is shooting to trial its products later this year and will not detail what they look like until then, Menezes said.

Meanwhile, AccessLan continues to draw on the roots its staff shares.

Besides Ludwick, the company employs:

- President Ofer Doitel, former vice president of Bay's net management division.

- Tricia Hill, vice president of engineering at AccessLan, who was in charge of Bay's frame switches, token-ring products and net management hardware.

- Steve Haughey, onetime Bay vice president of hardware, who now fills the same role at AccessLan.

Also on board is Software Director Dilip Chatwani, Mechanical Design Director Dewey Griffin and Technical Fellow Bob Smith — all former Bay employees.

© AccessLan: (408) 437-1680



Ludwick: One of many ex-Bay alums at AccessLan.

PROFILE: ACCESSLAN COMMUNICATIONS, INC.

Based: San Jose, Calif.

Founded: Sept. 1996

Funding: \$7.4 million from Sequoia Capital and Accel Partners

Employees: 35

Future products: Digital subscriber line gear for carriers and corporate networks

Competitors: Amati Communications, Copper Mountain Networks, Diamond Lane and Westell Technologies

Fun fact: Most of the management team came from Bay Networks



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IBM and Novell do deal on directories

Companies looking toward future integration of NDS with DCE services and mainframe security.

By Christine Burns
Orem, Utah

IBM will integrate Novell Directory Services (NDS) with its Unix and mainframe operating systems in accordance with a deal the two companies finalized last week.

The integration should give network administrators a way to centrally manage users, data and network resources across IntranetWare LANs and IBM's large-scale systems.

The licensing agreement, which took a year to negotiate, is one in a long list for Novell, Inc., which is peddling NDS to key computer and software vendors. And with NDS now coming to AIX, Novell has successfully placed NDS on more than 70% of Unix systems shipped. Novell receives no royalties from licensing the NDS source code but does get money from sales of add-on directory-enabled services such as replication.

Industry observers note this deal comes at a time when IBM is taking a hard look at the lackluster success it has had in selling its own Distributed Computing Environment (DCE) cell directory on AIX, OS/2 Warp Server and OS/390.

"This is directly related to the dismal reception that IBM's DCE initiatives have had in the marketplace," said one directory service analyst who requested anonymity.

The DCE cell directory is an enterprise networking service put forth in 1990 by Open Software Foundation, Inc.

IBM's Robert Henson, manager of software marketing for AIX, contended that NDS on AIX and the OS/390 represents only one option for its customers. IBM is not abandoning its DCE developments, Henson said. In fact, the companies will work together to provide stronger ties between IBM's DCE directory and NDS using the Lightweight Directory Access Protocol (LDAP).

Putting NDS on a mainframe will demonstrate NDS' ability to scale, said Michael Simpson, director of marketing for Novell's Internet Infrastructure Division. "That combination is going to produce one honkin' LDAP server," Simpson said.

IBM and Novell also are looking at integrating NDS with the bulletproof Resource Access Control Facility-based security system employed by OS/390

mainframe systems.

Gartner Group, Inc.'s Neil MacDonald criticized IBM and Novell for not delivering this type of integration in the first release of NDS on these IBM platforms. "True single sign-on to all network resources and centralized management can only happen if the directory is integrated deep down in the operating system," MacDonald said.

Florida State University in Gainesville has multiple NetWare LANs and is developing a separate distributed environment based on DCE services on AIX.

One DCE project manager could foresee some useful integration among the directories such as synchronized global name spaces. "But as far as integrating the different security structures that have such deep roots in their respective directories, it sounds like a big hassle to me," he said.

IBM will deliver NDS on AIX in two phases. Next month, the company will ship the directory service as well as NetWare file and print services as add-on options. In a major revision of the operating system planned for next year, IBM will integrate NDS into AIX and ship it with every RS/6000 server.

Having NDS running on large OS/390 systems will give companies a better means of tying existing mainframes into their PC LAN environments. An OS/390 component called LANRES already lets distributed NetWare servers off-load data to the mainframe where it can be centrally stored, backed up and sent to

mainframe printers.

But the NDS port to OS/390 — scheduled for initial delivery in the first half of next year — will increase integration to allow managers to define user access to all mainframe sources using the directory, said Jim Porell, senior technical analyst with IBM's OS/390 group. ■

CORRECTIONS

The story "DSL standard promises to force T-1 prices down" (NW, July 7, page 1) on HDSL2 mischaracterized the efforts of ADC Telecommunications, Inc., PairGain Technologies, Inc. and Level One Communications, Inc. to standardize the technology. Their joint proposal was developed independent of an earlier proposal put forth by Adtran, Inc.

Due to an editing error, a brief on Cisco Systems, Inc.'s plans to add 12G bit/sec switching modules to the Catalyst 5000 product line should not have said the modules would be based on ATM (NW, June 30, page 6). Cisco did not specify the module type. In addition, the story "IP address mgmt. vendors look to link LDAP with DHCP" (NW, June 30, page 21) inaccurately states that Cisco Systems, Inc. will unveil software that links LDAP and DHCP later this year. Cisco did not say if or when it will deliver such software.

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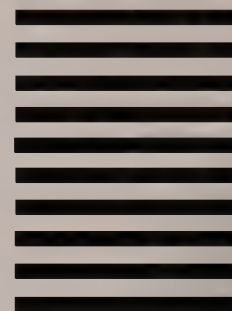


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Briefs

■ **Gigabit Ethernet** start-up **Extreme Networks, Inc.** last week announced it has closed a **\$12.3 million** second round of financing, building on the company's first round of \$5 million.



Extreme CEO
Gordon Stitt

The added funds come from new investor **Kleiner Perkins Caufield & Byers** in addition to Extreme's current investors: **AVI Management**

Partners, Norwest Venture Capital and Trinity Ventures.

The money will fuel the company's growth by providing working capital. It also will fund ongoing research and development and expansion of the company's sales and marketing groups, according to Extreme President and CEO Gordon Stitt.

© Extreme: (408) 342-0999

■ **MMC Networks, Inc.** last week announced a wire-speed, 16-port, full-duplex **Fast Ethernet chip** set that would enable network equipment vendors to deliver switches priced at less than \$200 per port. Currently, Fast Ethernet switches range from \$300 to \$800 per port.

MMC would not disclose which network vendors plan to use its PS1000-40 network processor. The chip, which can switch 2.5 million packet/sec, is priced at \$416.

© MMC: (408) 731-1600

■ **IBM and The Santa Cruz Operation, Inc.** last week struck a deal under which IBM will offer SCO's **UnixWare** as an option for its Intel Corp.-based servers. IBM is certifying UnixWare on all of its servers from the entry-level PC Server 310 to the four-way PC Server 704 models. IBM is working with resellers that will deliver IBM servers with UnixWare as an alternative to Windows NT and OS/2 Warp Server.

Shakeout reshaping server landscape

June was a busy month for acquisitions, and more are expected in coming months.

By Marc Songini

The server market is coming of age, and June saw three acquisitions underscoring this trend.

Compaq Computer Corp.'s \$3 billion purchase of Tandem Computers, Inc. was by far the biggest of the three recent acquisitions. The other two deals were Micron Electronics, Inc.'s purchase of NetFrame Systems, Inc. and Gateway 2000, Inc.'s purchase of Advanced Logic Research, Inc. (ALR).

While specific reasons behind the acquisitions varied, the deals demonstrate that the high-end server market is maturing, and there are a few too many companies pitching aggressively priced Windows NT machines. Server companies will continue to fold or sell out until the industry is almost completely absorbed by huge players, analysts said.

The result of consolidation will be fewer and larger players, which will narrow customer choice. On the plus side for customers, the combined companies may be better positioned to offer discounted bundles of servers and PCs as well as everyday

servers that boast features typically found only in high-end machines, analysts said.

Behind the shakeout

Analysts said market consolidation comes as no big surprise given the large number of ven-

ding for the same buying public, and some needed to go away," said Jerry Sheridan, an analyst with Dataquest, Inc.

"NT has finally become viable for the server," said Kimball Brown, another Dataquest analyst. Vendors of proprietary and

One reason is the existence of cash-rich PC companies looking to offset sagging PC sales and thin profit margins by broadening their product portfolios. These companies are better off snapping up independent server vendors than developing server technology on their own, she said.

Compaq, for instance, gains Unix and fault-tolerant technology from Tandem that might prove attractive to certain large

Server market shake-up

Three server vendors were gobbled up last month.

Acquiring/ acquired company	Announcement date	Price	What does this mean?
Micron/NetFrame	June 10	\$14 million in cash	A leading direct supplier of PCs gains a high-end server line.
Gateway 2000/ALR	June 19	\$194 million in cash	A leading direct supplier of PCs adds Intel-based servers to its product line.
Compaq/Tandem	June 23	\$3 billion stock swap	Compaq bolsters its product line with high-end NT and Unix servers as well as ServerNet clustering software.

dors trying to cash in on Windows NT's acceptance as an application server platform.

Companies such as ALR and NetFrame found themselves increasingly vulnerable to larger competitors that can get away with smaller profit margins on Intel Corp.-based NT servers. "There were too many vendors

premium servers, such as NetFrame and Tandem, are losing their edge as a result, he said.

Only large vendors will survive, according to Cheryl Currid, president of Houston consultancy Currid & Co. "What the market is saying is there [is no room for] independent server companies," she said.

customers. "By picking up a Unix vendor, Compaq has expanded its vistas greatly," Sheridan said. "Compaq has the capability to leverage its contacts both ways. The company can sell its high-end Tandem products to the Compaq installed base and sell Compaq products to Tandem's installed base," he said.

Companies acquired during the June shopping spree should be better off, too, analysts said.

"[ALR and NetFrame servers] had a very specific place in the market seven years ago," Currid said. The vendors made good PC-based servers, but over time, bigger companies such as IBM and Hewlett-Packard Co. invalidated them, she said.

Independent server vendors will continue to be an endangered species, but Currid said which company will be acquired next is anyone's guess. But the guessing should get easier as the number of independent server companies keeps dwindling. ■

LAN Switching

NBase bolsters switch with Fast Ethernet ports

By Jodi Cohen

Chatsworth, Calif.

NBase Communications last week rolled out a new module that will let customers stuff twice as many Fast Ethernet ports into the company's LAN backbone switch.

The company rolled out an eight-port Fast Ethernet module that slides into NBase's MegaSwitch II device, an eight-port 10M/100M bit/sec autosensing Ethernet switch with two expansion slots.

Customers can fill each slot with one of the new modules, providing as many as 24 Fast Ethernet links.

Previously, NBase only offered a two-port Fast Ethernet uplink module for the switch, providing up to 12 Fast Ethernet ports in a single box.

Customers can fully load the switch with Fast Ethernet links or choose to use only one of the expansion slots for Fast Ethernet ports.

The other slot can be reserved for one of NBase's existing ATM or Gigabit Ethernet uplink modules.

User applause

One NBase customer interviewed last week said he is excited about the new module.

"The higher density of 100M bit/sec ports is the final answer to quickly ramp up the wiring closet with the [MegaSwitch II] and throw out all those strained stackables and non-scalable hubs," said Steve Lewis, a network administrator at DynCorp. in Fairfax, Va.

Another customer, Woods Hole Oceanographic Institute in Woods Hole, Mass., is using the MegaSwitch II to provide connectivity to a Gigabit Ethernet backbone.

"It would be quite advantageous for folks with Fast Ethernet backbones to have that kind of added port density in the box," said Dennis Lander, network group leader for the institute.

"But I'm going to keep using just one slot for Fast Ethernet to feed down to our hubs and the

See NBase, page 20

Get more info online:

- Server reviews
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Do you really need Microsoft's Memphis OS?

By the time you read this, Microsoft's next desktop operating system should be in the hands of tens of thou-

sands of beta testers around the world.

Known by its code name Memphis, this successor to Windows 95 will become the

most widely tested software release ever before it finally sees the light of day as Windows 97 or 98.

Memphis is an ambitious product. The major change from Windows 95 is in Memphis' use of Web browser technology to replace much of the folder technology introduced in Windows 95. Folders are still there, but now they look like Web links, even down to being underlined when you pass the cursor over them.



Dave Kearns

There are deeper questions here, though. What does the change mean to you and end users at your organization? Will the software upgrade make end users more productive? Will it enable them to do things they couldn't do before? In short, is it a better way or just a different way?

To find answers to these questions, I suggest we take heed of NASA's new mantra of "faster, better, cheaper."

Like many of you, I spent the Fourth of July weekend watching the marvelous story of the Mars Pathfinder mission unfold. The breathtaking views of the Martian landscape were interspersed with comments from NASA administrator Dan Goldin, who never lost a chance to repeat the new mantra.

No more \$20,000 hammers when a \$4.95 one from Sears will do. Communications between Mars and Earth — via off-the-shelf Motorola wireless modems — were carried out at what the Pathfinder Flight Team considered a blistering rate of 8K bit/sec. NASA could have commissioned specially designed tools for 10

times the money and had three to four times the throughput, but the agency chose instead to have 10 times as many missions.

Maybe it's time we started evaluating software and vendors according to the new NASA way. When that new release comes along, is it faster, better, cheaper? Or is it just different? If there's a task to do, do you need a new piece of software designed to do that task and only that task? Or can something you already have be adapted to meet the need?

Some of these questions already are being raised as part of the network computer and NetPC discussion. Oddly, though, it's software vendors such as Oracle and Netscape that tell you older hardware is sufficient to do the job — provided you add new software.

Maybe we need to step back, examine the software we have, imagine different ways to use it and intelligently link hardware and applications to solve problems. We just might come up with a faster, better, cheaper way to get the job done.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

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Continued from page 19

other [slot] for Gig," he said.

Users typically use the MegaSwitch II for interlinking Fast Ethernet hubs or

switches, providing high-speed server links or creating a Fast Ethernet backbone.

Switch specs

The MegaSwitch II operates at wire speed and has an aggregate bandwidth of 1G bit/sec.

Key switch features include virtual LAN capability and flow control in half- and full-duplex modes.

In addition, the MegaSwitch II supports SNMP and Remote Monitoring traffic management as well as embedded Spanning Tree for link redundancy on every port.

NBase also offers its MegaVision SNMP application for managing all of the vendor's devices simultaneously.

The eight-port 100Base-T module for the MegaSwitch II is priced at \$1,100, or \$138 per port, and is available now.

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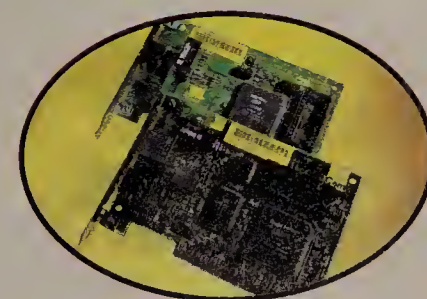
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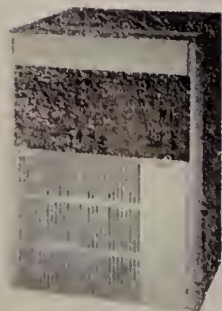
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Briefs

■ **Cisco Systems, Inc.** is now shipping the **Route Switch Module (RSM)** for its Catalyst 5000 line of LAN switches.

RSM is a router that forwards more than 1M packet/sec between switched virtual or emulated LANs. Supported network protocols include IP, IPX, AppleTalk, DECnet, VINES, XNS and SNA.



Cisco's Catalyst 5000 line will have a Route Switch Module.

RSM also supports standard routing protocols, such as the Routing Information Protocol, Open Shortest Path First and Border Gateway Protocol, as well as Cisco's Interior Gateway Routing Protocol, Enhanced IGRP and Hot Standby Routing Protocol. The RSM costs \$19,995.

© Cisco: (408) 526-4000

■ **Hewlett-Packard Co.** last week said 16 vendors working on the **Application Response Measurement API** are planning two enhancements.

The first enhancement will enable administrators to identify the specific components of a transaction that may be affecting overall application performance. The second API upgrade will let management applications determine whether a problem exists based on expected vs. actual transaction response times, HP said.

The enhancements are expected to be finalized this summer.

■ **Advanced Computer Communications, Inc. (ACC)**, announced last week that its ISDN routers will support the **ISDN signaling channel**, the D channel, to carry data traffic starting in September. The D channel is a dedicated line that can be configured by a phone company to connect with an Internet service provider to allow continuous connection to the Internet.

© ACC: (805) 685-4455

3Com takes on Ascend

Dial-up access concentrator competition heats up.

By Tim Greene
Santa Clara, Calif.

3Com Corp. is challenging Ascend Communications, Inc. for bragging rights to the biggest, baddest dial-up concentrator.

3Com last week announced the HiPer Access System, which consists of three hardware modules for its central site Total Control Enterprise Network Hub chassis that can increase dial-up support sixfold.

With the new Total Control features, users can be added incrementally as their nets grow, rather than forcing them to buy additional chassis as they would today.

In an enterprise, users are likely to install a few of the new access cards in their current Total Control chassis rather than swapping out all the cards, said Brendan Hannigan, senior analyst for Forrester Research, Inc.

With the new cards, two Total Control chassis can be tied together to provide 672 ISDN or modem connections. This puts Total Control in direct competition with Ascend's biggest dial-up box, the MAX TNT.

In addition, the Total Control chassis takes up less space than the TNT, which fills more than twice the rack space that two Total Control chassis occupy.

The Total Control chassis, which 3Com obtained earlier this year through its acquisition

of U.S. Robotics, supports two T-1 lines or four Primary Rate Interface ISDN lines. This allows the chassis to handle a total of 48 modem calls or 92 ISDN Basic Rate Interface calls.

The new system consists of two cards. The first, the HiPer DSP, contains 12 digital signal processors (DSP) that can handle 24 incoming ISDN, 56K bit/sec modem or V.34 modem calls from a T-1. By adding a new card, users can increase the capacity of the box by 50%. A fully loaded Total Control chassis can hold 14 of the new cards.

The DSPs are programmable to support further interfaces, such as frame relay, with just a

software download.

A second new card is the HiPer Access Router, which routes all calls coming into the chassis. Two of the cards can handle traffic from a chassis containing 14 HiPer DSP cards. If one router card fails, the other picks up all the routing. When both are working, they load-share.

Software developed by USR allows one DSP to handle two incoming channels.

Software battle

With 3Com beefing up the sheer number of calls it can handle to match Ascend's TNT, the competition between the two companies shifts to what functionality they can add through software, according to Bernard Schneider, Ascend's vice president of strategic business development.

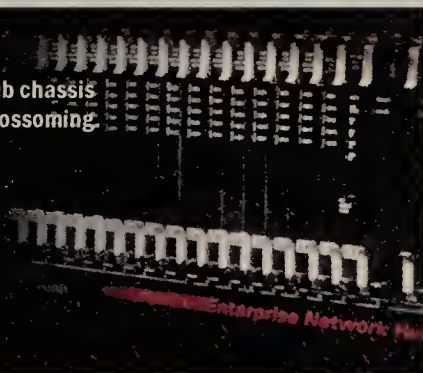
The HiPer DSP card is scheduled for availability in mid-August for \$11,500 list price. The HiPer Access Router is due in early September with dual 10/100 Ethernet ports for \$9,995.

© 3Com: (408) 764-5000

MORE TOTAL CONTROL

The Total Control Enterprise Network Hub chassis from 3Com's U.S. Robotics division is blossoming.

- Dial-up ports will increase from 48 to 336.
- T-1 support will grow from 2 lines to 14.
- ATM will be supported.
- CSUs will be integrated.



Trio to fill OpenView gaps

By Jim Duffy
Anaheim, Calif.

Help has arrived for OpenView users demanding a Java-based interface, easier map administration and rapid fault isolation for the Hewlett-Packard Co. management platform.

Three OpenView application developers separately have tackled each issue with new software products. Edge Technologies, Inc., Onion Peel Software, LLC and System Management Arts, Inc. (SMARTS), respectively, have come up with what they believe are solutions to the Java, map and fault-resolution problems vexing OpenView users.

Edge's N-Vision is a fully Java-compliant OpenView front end, the company said. It provides real-time access to OpenView network status and configuration information through any Java-enabled browser on any system — Unix, PC or Macintosh — without the overhead of X Window sessions.

OpenView users are anxious for the product to incorporate

more Web-based technologies, including Java (NW, June 23, page 1).

"Edge [is] where we'd like HP to be," said Paul Edmunds, senior network analyst at Duke Power Co. in Charlotte, N.C. "Java will allow us to get that information to more people."

N-Vision includes a graphical network topology display, dynamic event browser and SNMP Management Information Base browser. The topology display and event list are updated in real time, and users can point and click to pan, zoom, drill down, check status, check events and switch OpenView maps.

Users can access N-Vision over the Internet, intranets or via remote dial-in using 28.8K-bit/sec modems.

The downside to N-Vision is that no Motif- or Web-based OpenView applications can be launched from it; however, Edge is working with some OpenView third parties to rectify that.

N-Vision costs \$14,995 per server, which includes a five-user

concurrent license. It is available now for Sun Solaris, and an HP-UX version will ship later this month.

For those sticking with a Motif-based graphical user interface, Onion Peel has announced Amerigo, software that helps users customize and administer OpenView maps, symbols and objects.

To date, it has been difficult for users to customize and update multiple OpenView maps because it is a time-consuming, error-prone manual process that lacks synchronization and coordination of symbols and objects.

Amerigo helps automate this

process by providing a "branching tree" interface and rules-based templates. Configurations can be applied to any map on any OpenView system via point-and-click commands, Onion Peel said.

Rules define what attributes a device has, and Amerigo automatically populates submaps based on these rules. If map customizations are lost after rediscovering the network topology, Amerigo automatically rebuilds them.

Amerigo runs on HP-UX 10.X and OpenView Version 4.11. It is priced from \$995 to \$8,995 and is available now.

See OpenView, page 24

OpenView sesame

Third-party extensions to the HP management platform:

Company	Product	Function
Edge Technologies	N-Vision Java GUI	Provides real-time access to OpenView network status and configuration information
Onion Peel Software	Amerigo	OpenView map administration and customization tool
System Management Arts	InCharge Fault Manager	Event correlation and root cause analysis for OpenView-managed routers and router interfaces

Cabletron broadens wide-area access options

By Tim Greene
Rochester, N.H.

If you still think of Cabletron Systems, Inc. as only a LAN company, think again.

Cabletron last week announced that come September it will support wide-area links into its Multi Media Access Center (MMAC)-Plus hub chassis using technology bought last year through its acquisition of Netlink, Inc. (NW, Sept. 30, 1996, page 6). The combination will let users more easily tie their local networks into WANs without buying an intervening router, stand-alone frame relay access device or DSU/CSU.

The Netlink Frame Relay Module for the 14-slot MMAC-Plus chassis supports two full T-1 frame relay lines as well as six serial ports for local termination of legacy data.

The MMAC-Plus chassis is designed for large central sites and supports more than 100 different interface modules, including Ethernet, token ring, FDDI and SNA.

The frame relay module gives users the flexibility to let multiple remote users tap into centrally located databases. "This could be a big benefit for a dispersed envi-

ronment," said Barbara Maaskant, executive director of information services at Roberto C. Goizueta Business School at Emory University in Atlanta.

She said the frame relay interface supports more remote users over a single T-1 link than other alternatives such as ISDN, particularly for low-bandwidth applications.

Cabletron buying spree

In an effort to expand its WAN product line, Cabletron last year bought Netlink and its frame relay technology. It also grabbed Network Express, Inc. and its ISDN expertise.

Analysts said the frame relay support indeed fills a gap in Cabletron's WAN product line. One analyst said Cabletron needs to take the module a step further and add data compression. Craig Johnson, director and principal analyst with Current Analysis, a consultancy in Ashburn, Va., said compression would help reduce bandwidth demands on frame relay links between the central site and midsize-to-large remote sites.

Large central sites are the new MMAC-

Plus module's target market, according to Roger Walton, vice president of marketing for Cabletron's branch networking division.

Routing support

The module supports all the features of the Netlink FRx 4000 and 6000 — earlier, stand-alone frame relay devices from Netlink. Those features include routing for IP and IPX traffic and bridging for NETBIOS, AppleTalk and DECNet.

In addition, the module can pinch pennies by letting multiple protocols share a single frame relay Data Link Connection Identifier (DLCI) as long as the connection is supported at the remote end by another Netlink device, such as the Model 4000, Walton said. Service providers charge per DLCI, and there is no standard for sharing them.

The module also lets users allocate bandwidth for particular applications and protocols to ensure adequate response time.

The Netlink Frame Relay Module costs \$25,000 and ships later this month.

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OpenView

Continued from page 23

Once devices are mapped, they have to be monitored for potential faults. That is where SMARTS' InCharge Fault Manager comes in.

InCharge is software that combines SMARTS' event correlation and root cause analysis technology with OpenView's discovery and polling capabilities. Using a specially developed adapter for OpenView, InCharge collects OpenView events and correlates them within seconds to identify root causes of faults, said Bill Leavy, vice president of marketing at SMARTS.

InCharge uses the OpenView topology to compute "problem codes" that uniquely identify each fault and update the codes whenever the network topology changes.

InCharge compares events to precomputed problem codes to identify the root cause of events.

InCharge Fault Manager costs \$25,000 and will ship in October. It runs on HP-UX and Solaris and supports OpenView Version 4.1.

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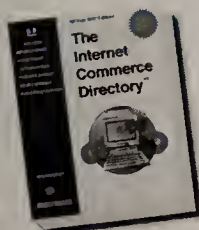
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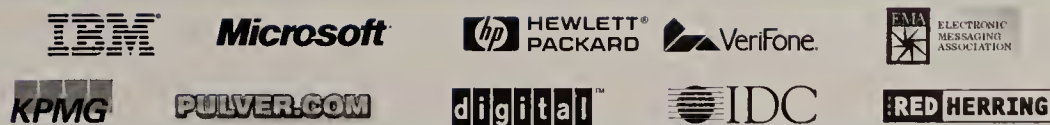
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<input type="checkbox"/> Half Day Workshop	Sept. 9, 11	select 1 from Box B below	\$250	\$300
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|---|--------------|
| <input type="checkbox"/> T-1 Assessing & Evaluating Internet Commerce Web Sites | full day |
| <input type="checkbox"/> T-2 Designing, Building & Maintaining an Enterprise Web Server | full day |
| <input type="checkbox"/> T-3 Corporate Networking to Support Internet & Intranet Apps | full day |
| <input type="checkbox"/> T-4 Intranet Design and Implementation | half day, am |
| <input type="checkbox"/> T-5 Introduction to Doing Business On The Net | half day, am |
| <input type="checkbox"/> T-6 Successful Implementation of Intranets and Groupware | half day, am |
| <input type="checkbox"/> T-7 Measuring Web Marketing: Maximizing Advertising Dollars | half day, am |
| <input type="checkbox"/> T-8 Internet Marketing - What Really Works | half day, am |
| <input type="checkbox"/> T-9 Net Marketing - What Comes Next | half day, pm |
| <input type="checkbox"/> T-10 Security Beyond the Internet | half day, pm |
| <input type="checkbox"/> T-11 The Law and the Web | half day, pm |
| <input type="checkbox"/> T-12 Human Side of Intranets - Content, Style, Politics | half day, pm |
| <input type="checkbox"/> T-13 Advanced Program In Doing Business On The Net | half day, pm |

Box B Workshop Selection - September 9, 10, 11

- | | |
|---|-----------------------|
| <input type="checkbox"/> S-1 General Conference Sessions | Sept. 9 full day |
| <input type="checkbox"/> S-1a General Conference Sessions | Sept. 9 half day, am |
| <input type="checkbox"/> S-1b General Conference Sessions | Sept. 9 half day, pm |
| <input type="checkbox"/> W-1 Microsoft Internet Workshop | Sept. 9 full day |
| <input type="checkbox"/> W-2 ISP Business Outlook (IOC) | Sept. 9 half day, pm |
| <input type="checkbox"/> S-2 General Conference Sessions | Sept. 10 full day |
| <input type="checkbox"/> S-2a General Conference Sessions | Sept. 10 half day, am |
| <input type="checkbox"/> S-2b General Conference Sessions | Sept. 10 half day, pm |
| <input type="checkbox"/> W-3 EMA Workshop | Sept. 9 full day |
| <input type="checkbox"/> W-4 H-P/Verifone Workshop | Sept. 9 half day, pm |
| <input type="checkbox"/> S-3 General Conference Sessions | Sept. 11 full day |
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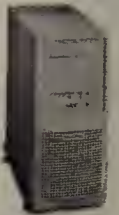
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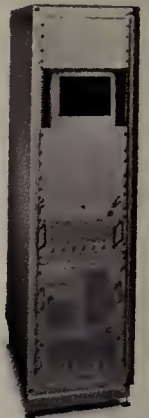
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Briefs

■ **AT&T** last week launched **International T155 service** between San Francisco and Tokyo in partnership with Japanese carrier Kokusai Denshin Denwa. The first customer for the service, which provides a point-to-point dedicated link at 155M bit/sec, will be Japanese Internet service provider Internet Initiative of Japan. AT&T also offers 45M bit/sec point-to-point service between the U.S. and Hong Kong, Taiwan and Korea.

■ **BellSouth Corp. and Visual Networks, Inc.** recently entered a joint marketing agreement that will give customers a way to monitor the performance of their frame relay service. The two companies will comarket BellSouth frame relay service and Visual's smart DSUs/CSUs and software, called Visual Uptime, which will let users monitor performance of the network they buy from BellSouth.

■ **Italy's Telecom Italia** has joined **AT&T-Unisource Communications Services**, a pan-European joint venture between AT&T and several European national carriers.

The move restores the number of AT&T's main European partners to four following the recent defection of Spain's Telefonica de Espana to a joint venture with MCI Communications Corp.

■ **The New York State Public Service Commission (PSC)** is jumping on **AT&T** for a plan to eliminate complaints that the company is switching customers over to AT&T long-distance service without their permission.

AT&T has a plan to stop the practice, known as slamming, and the PSC recently called on AT&T to implement it.

The commission received 389 AT&T slamming complaints between Jan. 1, 1996, and Feb. 1, 1997.

MCI data-conferencing service attracts few users

Company cites lack of marketing help from Microsoft, hopes document conferencing on the 'Net is the ticket.

By David Rohde
Washington, D.C.

With data-conferencing software now installed on millions of PCs, MCI Communications Corp. officials are trying to figure out why hardly anyone has subscribed to their Document Conferencing service.

Among the apparent reasons: a continuing search for compelling applications and the lack of expected marketing assistance from Microsoft Corp.

Two years after MCI's purchase of Chicago-based Darome Teleconferencing, Inc., now known as networkMCI Conferencing, MCI is experiencing an audioconferencing boom. But

specific carrier's conferencing service.

Selling to the choir

Partly as a result, MCI to date has certified only 7,000 to 9,000 users of the Document Conferencing service. Most of the users are MCI employees, according to Karen Frazier, product marketing manager for MCI Document Conferencing. By contrast, Microsoft reports that four million copies of NetMeeting have been installed on PCs.

Certification essentially involves training potential users not only on the technology, but also the etiquette of participating in a shared-application conference, Frazier said.

"It shows what you can and can't do, so it's not like a bunch of kids running up to the blackboard, which we've had," Frazier said.

Following general availability of Net Conferencing next month, MCI will try on its own to promote the service

to users of NetMeeting and Data-Beam Corp.'s FarSite, both of which are based on the T.120 data-conferencing standard. Other targets include users of Intel Corp.'s ProShare desktop videoconferencing software, which also supports T.120 applications.

But differences in the packages' capabilities could continue to complicate the task, MCI officials conceded. NetMeeting is the only software that supports true application sharing, as opposed to the less robust whiteboarding capability, which enables a participant to highlight and change portions of the document while others look on passively. "FarSite cannot support true collaboration," Frazier said.

On the other hand, FarSite is the only software that can support all participants using a browser interface over the Internet, which entails no additional cost. Each user making a direct dial-in connection to MCI's conference server rings up a toll as

high as \$1 a minute (see graphic).

MCI officials hope they can win customers in brokerage houses, where several investment analysts recently participated in a joint MCI-British Telecommunications plc briefing via the Document Confer-

encing service. They also hope lawyers will use the service to collaborate on documents with each other or their clients.

"But the underlying technology has to be totally transparent to the users," said Jay Crookston, vice president of networkMCI Conferencing. ■

Telecom Rulings

Court raps FCC for pay phone plan

By David Rohde
Washington, D.C.

A federal appeals court earlier this month partially overruled new Federal Communications Commission rules forcing many carriers to compensate pay phone owners for coinless, toll-free calls.

While the rulings should result in lower toll-free costs for users, they will have to wait a while before carriers roll back recent price increases on calls placed to 800 and 888 numbers.

The U.S. Court of Appeals for Washington, D.C. said the FCC compensation scheme is legal, but the amount set by the FCC, equivalent to 35 cents per call, is "arbitrary and capricious."

The court also said the FCC must impose the same rules on all carriers that carry toll-free calls.

The FCC initially had placed the burden only on larger carriers.

Going up

Citing the new costs, large long-distance carriers have raised 800 and 888 rates several times this year.

The price increases generally apply to all such calls, even those unrelated to the pay phone controversy, including 800 dial access to corporate networks and the Internet.

At the time, AT&T also raised some outbound business rates, noting it also must now compen-

sate pay phone owners for calling card calls on plans such as AT&T's Software Defined Network service.

AT&T stopped making the payments to pay phone owners right after the court issued its ruling, said Bill Archer, AT&T's marketing vice president for voice network services.

But AT&T has not yet rolled back the 800 and 888 price increases to users because it does

"We're obviously pleased the Court of Appeals agreed that pay phone compensation levels set by the FCC were arbitrary."

Ken Sichau, vice president of business network services, AT&T

not yet know what new compensation rates the FCC will come up with, Archer said.

"We look forward to working with the FCC and the industry to establish compensation at a more reasonable level," added Ken Sichau, AT&T's vice president of business network services.

The controversy began after the nation's pay phone owners complained to Congress and the FCC that the dramatic rise in 800 and calling card calls left them bereft of coin revenue for a growing percentage of calls placed from their equipment (NW, March 3, page 6). ■

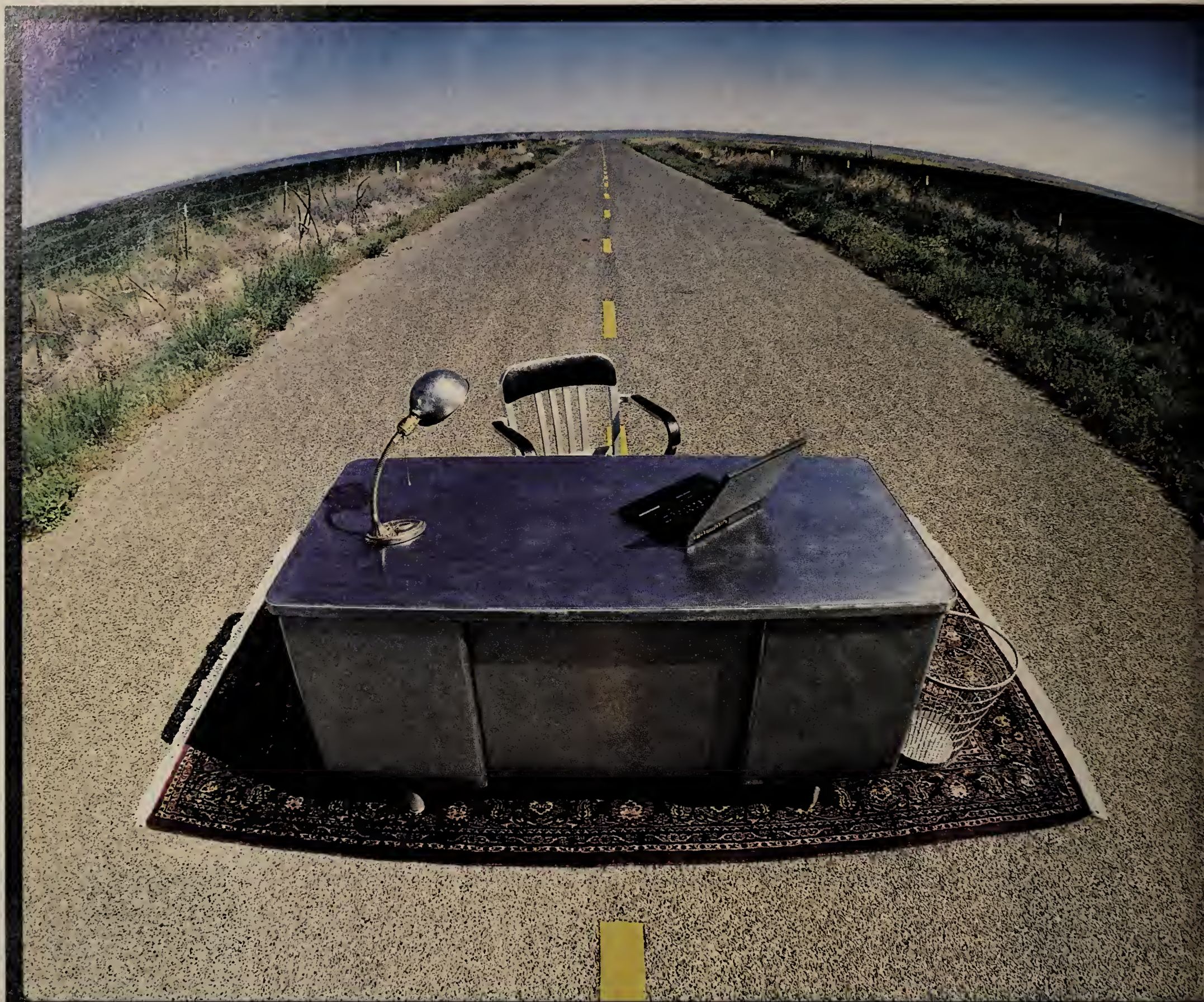
ADMISSION FEES	
Prices for MCI's Document Conferencing:	
Service	Cost per participant
Joint data and audio conferencing	\$1 per minute
Data conferencing only	63 cents per minute
Audio conferencing only	37 cents per minute

MCI's multipoint Document Conferencing service is drawing few users.

Announced in October 1995, MCI Document Conferencing allows as many as 23 participants to collaborate on the same document, sharing text, graphics and scanned images. A new version to be delivered this summer, called Net Conferencing, will enable users to dial in to the session over the Internet via a Web browser.

Originally, Microsoft, as part of a wide-ranging technology and marketing agreement with MCI, planned to put an icon in its Windows 95 operating system that would launch MCI Document Conferencing sessions. "But the Internet has changed to support that," said Brent Ethington, lead product manager for Microsoft's NetMeeting conferencing software.

Because so many users have the ability to share documents over the Internet, Ethington explained, Microsoft does not believe it needs to support a



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Not 'x'actly what you wanted

When I was a kid, I had this neat, three-wheeled "spaceship" called an X-15. My brother convinced me that if I put fuel into a little hole in the back, I

could zoom down the street at 100 mph.

What really made the spaceship cool was the "x." Indeed, if you want to make anything seem high-powered or mysteri-

ous, simply put an "x" in front of it, and a seemingly ordinary item will be transformed into something space-age.

Lately though, the meaning of "x" has become a little less space-age and more of a trash dump. Don't understand something? Stick an "x" in front of it.

For example, one vendor briefing us on some technology plans last week

started talking about the LECs, ILECs, CLECs and so on and just grouped them together as "xLECs."

The same holds true for xDSL. It includes ADSL, HDSL, MDLS, IDSL, VDSL, RADSL and S-HDSL.

The use of the "x" in these cases fails to recognize that each of the xLEC market segments is very different in its needs, strengths and weaknesses. This could be a fatal error in some circumstances, such as making assumptions about when and how xLECs will deploy xDSL.

On the other hand, the "x" trick is really quite useful, especially to consultants. It means that appearing smart about telecom technology is becoming easier. You just have to put "x" in front of the word, and instantly you can generalize any topic.

So let's try this. Say you're at a party and you are the only one there who hasn't read our *ATM For Dummies* book, so you don't know all there is to know about the different transmission schemes for ATM. Instead of having to spout off UBR, VBR-RT, VBR-NRT, CBR, ABR, etc., you can simply say "xBR," and you're covered.

There's a danger inherent in this trend, however. I recall reading a book by Edwin Newman when I was a kid, in which he challenged everyone to use the correct word in every sentence in order to maximize one's ability to communicate. He disparaged the use of "stuff," "thing" and other equally nondescript words.

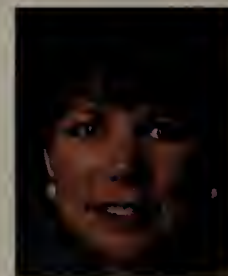
Newman was right. It's easy to use nondescript "x" words because of what you might be leaving out had you been more specific. If you are talking about remote LAN access as an application, you might want to discuss symmetrical options, so xDSL would not be the best word to use — SDSL, IDSL or HDSL might be better.

The problem is that people in our industry today are falling behind in keeping up with the latest and greatest telecom devices and trends. The "x" factor allows them a bit of latitude.

The solution is to try harder to keep up and not fall back on something too general to really address a specific situation. With technology moving at its current rate, this is extremely challenging.

Using the generic may sometimes provide exactly the wrong outcome — inaccurate results because of generic assumptions and miscommunication due to generic terminology.

Briere is president and Heckart is director of broadband with TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.



Daniel Briere and Christine Heckart

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13

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INTERGRAPH
FEDERAL SYSTEMS



Government Best Buys is an editorial supplement produced by the staff of *Federal Computer Week*. *Government Best Buys* features reviews and tests of hardware, software and networking products available to government buyers on agency contracts and the General Services Administration schedule.

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COVER STORY

16 *13 Desktop Deals: The Best All-Around Systems On the Schedule*

The FCW Test Center evaluated more than 20 desktop PCs — some running on Intel Corp. 200 MHz Pentium processors with MMX technology and others running on Advanced Micro Devices Inc. 200 MHz K6s. We recommend 13 systems that all scored 7.0 or higher on our scale of 1 to 10. Turn to Page 16 to find out which systems made the cut.

SOFTWARE

38 *Pushing Your Buttons: New Tools for Intranets*

As government workers tire of browsing slow and often outdated Web sites, they're showing more interest in a new model of Internet information sharing called push technology. Our reviewers evaluated three of the leading packages that allow agencies to broadcast important information to workers.

DEPARTMENTS

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COMING AUGUST 1997

CD-ROM Towers

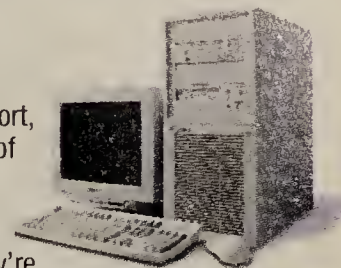
If you're looking to host several CD-ROMs on your network in a secure, easy-to-administer fashion, be sure to read our upcoming review of CD-ROM towers. We'll benchmark the performance of six entry-level and midrange systems as well as evaluate their design and features. And we'll recommend the units that offer government buyers the best value.

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If you need to buy PCs for your agency this summer, you've come to the right place.

The July *Government Best Buys* is packed with hard data and test results on 20-plus systems evaluated recently in our test center. Some systems use Intel's Pentium MMX processor, while others use AMD's new K-6 processor. We

even looked at a comparable Macintosh from Apple Computer Inc. and a Mac clone from Power Computing Corp. All the systems we reviewed are available on the GSA schedule, and many ship on agency contracts too.

We used our rigorous testing methodology to evaluate all these systems. For every machine, you'll

see the following scores:

- ▶ For performance, we measured how fast a system ran our benchmark of eight popular business applications.
- ▶ For system design, we evaluated components, hardware and software features.
- ▶ For setup, we looked at the

software that came factory pre-installed on the system and the on-line tutorials offered.

- ▶ For expandability, we looked at available configurations and the number of open slots.
- ▶ For compatibility, we counted the number of operating systems supported.

- ▶ For support policies, we considered the types and hours of support offered as well as the length of the warranty.
- ▶ For technical support, we called vendor support lines and measured time on hold and whether our questions were answered correctly.
- ▶ For pricing, we used the lowest quote we could find from a schedule holder.

Then we added up the points. In the end, 13 systems scored above a 7.0 on our scale of 1 to 10. Government buyers should feel confident buying any one of these solid, all-around performers.

No other publication conducts this kind of extensive testing of PCs shipping on government contracts. So when you go to spend the taxpayers' dollars this summer, be sure to buy computers recommended by *Government Best Buys*.

On another note, I'd like to invite you to visit our recently updated Web site: www.fcw.com/pubs/gbb. Not only will you see a new, easier-to-navigate design, you'll also see a host of additional features and reference materials.

One new feature is an on-line database of federal government computer contracts. So far we've listed more than 25 Defense Department contracts and blanket purchase agreements. Later this month, we'll add the major governmentwide acquisition contracts. And in August, we'll add information about GSA schedule holders.

These lists provide general information about each of the contracts, including purchasing eligibility, products offered and associated fees. Hot links are provided to agency contracting shops and vendors where available.

Our Web site also includes an electronic "morgue" of all the reviews we've published since November 1995. You can search these reviews by product category, product name or vendor name. You can also browse through lists of government testing organizations, lab accreditation programs and benchmarks available on-line.

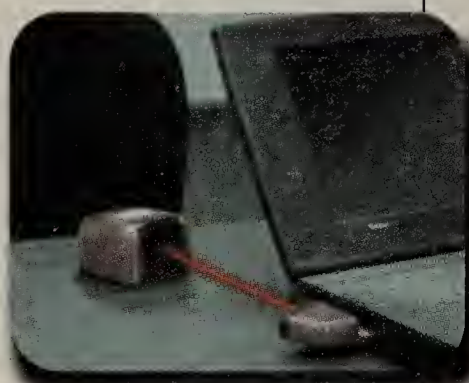
The *Government Best Buys* team is committed to helping government computer buyers choose the right products and contracts. Let us know if there's anything else we can do to make your job easier. ◀

Carolyn Duffy Marsan
Editor
cdm@fcw.com

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JVC Wireless Laptop LAN kit includes either a left or right PCMCIA card, a *Mobile unit* which is connected to the network backbone and a *T-Adaptor* that provides standard DC power to the Mobile unit. JVC Wireless Laptop LAN provides a 10 Mbps wireless ethernet laptop link; an ideal quick LAN access connection for outside sales staff, visiting remote office personnel or telecommuting professionals.



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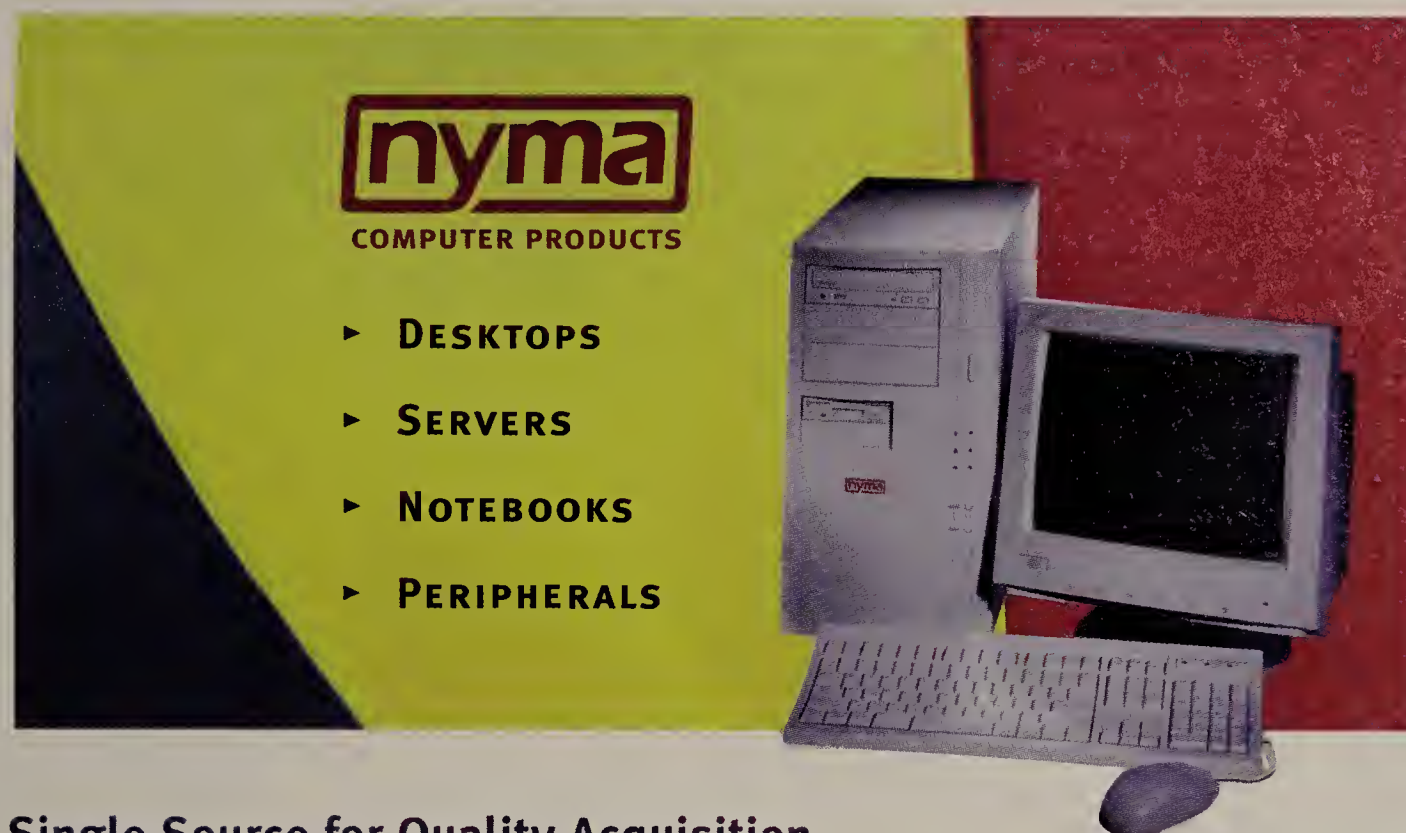
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7-Ounce Handheld Assistant

Sharp Electronics Corp. says it has the answer for government workers who need to stay organized and wired while on the move. The new SE-500 personal digital assistant (PDA), which was unveiled at the PC Expo in New York last month, is a pen-based machine that gives mobile professionals access to e-mail, calendars and appointments. It can even download text from World Wide Web sites or Windows-based PCs using the unit's Windows Clipboard function.

The SE-500 weighs just less than 7 ounces and features a monochrome 240-by-160-pixel screen. The unit's built-in 14.4 kilobit/sec modem enables the mini organizer to deliver Internet e-mail through a connection with the user's Internet Service Provider. The unit can also dial into a remote-access server to update files and e-mails.

The SE-500 comes standard with Sharp's proprietary operating system and three personal information manager (PIM) software packages: Lotus Development Corp.'s Organizer 97, Microsoft Corp.'s Outlook and Symantec Corp.'s Act! 3.0.

A docking station comes standard with the SE-500, which features a user-definable auto-sync; once clicked into the station, the unit starts up automatically and begins updating the PC and the PDA of schedule and other

user changes. The SE-500's docking station is bundled with Puma Technology Inc.'s IntelliSync software, which works with any PC running Windows 95 or Windows NT 4.0. An Infrared Data Association infrared port for wireless PC communication is also included, enabling users to exchange data with another PDA or PC with infrared capability.

With the device, users can create and send canned e-mail messages and stock responses to incoming mail. The unit also features "Handwritten Ink Notes," which let you use the accompanying controller pen, called the stylus, to send handwritten e-mails as bitmapped images. The feature also lets you write organizer applications as if you were doing it on paper.

Other popular PIM capabilities include the scheduling and "to do" features, which are important on any

organizer platform. The SE-500 helps you keep track of your expenses, and it rounds out its features with a calculator and a home/world clock.

Sharp is working to get the SE-500 on the General Services Administration schedule. For more information, go to Sharp's Web page at www.sharp-usa.com.

—Joshua Dean

Software Locates Files

Seiko Instruments USA Inc. has begun shipping Smart DiskLabeler, a software utility program designed to end user frustration in locating files stored on disks.

The product provides a simple and convenient method to label and catalog diskettes so that files can be found easily and instantly on Compaq Computer Corp., SyQuest Technology Inc. and Iomega Corp. disks as well as other storage media. It is designed to eliminate the daily hassles of having to insert and read a number of disks to find one file.

The software maintains a directory in Windows of all files saved on the various media and allows the user to easily track and find a particular file. In addition to storing names and locations of all files, the program assigns a unique name and description to each disk, adds notes to remind the user of information about a file or disk, and prints unique labels with a disk name, description, date and contents for easy identification.

DiskLabeler, which costs \$29.95, is available in Seiko's stores, catalogs and direct-sales offices. For more information, call (800) 688-0817.

—Heather Harreld

Comsat Provides Remote STU-III Communications

Comsat Corp., Bethesda, Md., on June 3 announced Secure Telephone Unit (STU-III) encrypted voice and data communications service for government, military and business users of their portable Planet 1 personal satellite telephone.

STU-III encryption devices are widely used by members of the intelligence community, diplomatic corps and law enforcement agencies for secure communications. With the incorporation of STU-III technology, Planet 1 meets the stringent standards set by the National Security Agency for communicating with analog STU-III encryption devices at classification levels up to top secret, the company said.

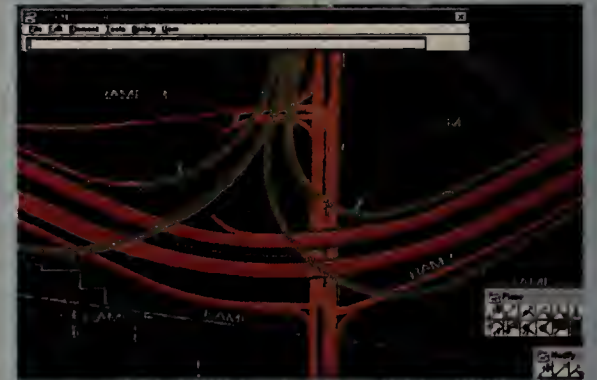
To activate STU-III service, Comsat installs proprietary software into the Planet 1 phone, which then can be connected to a standard STU-III phone to communicate with other STU-III devices. According to the company, the solution is perfectly suited for remote government installations that do not have direct connectivity to the Defense Switched Network. Planet 1 service is currently carried over the Inmarsat-3 series of communications satellites, which provide coverage over Asia, Australia, Africa, the Middle East, the former Soviet Union, Europe and South America. Global coverage is expected soon.

For more information on Planet 1, contact Comsat at (888) PLANET1 or visit its Web site at www.comsat.com/planet1.

—Daniel M. Verton

STATE AND LOCAL

GEOPAK Supports State DOTs



GEOPAK Corp., North Miami Beach, Fla., recently added Ohio to its growing list of state transportation departments employing its civil engineering and design software. The initial purchase of 150 seats, which was announced in April, is expected to grow to about 300 seats with the deployment of the software throughout the agency's district offices, according to GEOPAK.

A design software evaluation team from the Ohio DOT recommended GEOPAK based on its ability to provide seamless support across multiple platforms and because of its superior performance in several technical categories, the company said. The evaluation team tested GEOPAK's ability to handle digital terrain modeling, survey/data input, plan sheet generation, general coordinate geometry, rights of way, horizontal and vertical alignments, and cross-sections.

GEOPAK is compatible with Windows NT and DOS operating systems as well as various hardware platforms, including Hewlett-Packard Co.'s Series 700, Sun Microsystems Inc.'s SPARC, Silicon Graphics Inc.'s workstations and Intergraph Corp.'s Clipper-based workstations. In addition, all GEOPAK databases are binary-compatible across all platforms. Furthermore, GEOPAK has been designed with Bentley Systems Inc.'s MicroStation graphical user interface and provides identical operation.

To date, GEOPAK users include more than 10 state transportation departments, the Federal Highway Administration, various offices of the Army Corps of Engineers and hundreds of private consulting firms.

For more information on GEOPAK, contact the company at (305) 944-5151 or visit its Web site at www.geopak.com.

—Daniel M. Verton

BEST-SELLING SOFTWARE

May	Apr.	Product	Company
1	2	Windows NT Server	Microsoft
2	—	BackOffice	Microsoft
3	3	Exchange	Microsoft
4	4	Windows 95	Microsoft
5	8	Systems Management Server	Microsoft
6	—	Outlook 97	Microsoft
7	5	Office	Microsoft
8	—	Notes	Lotus
9	9	Windows NT Workstation	Microsoft
10	—	Windows	Microsoft

This list ranks the top 10 software products according to the total number of units sold in May 1997 on the General Services Administration's multiple-award schedule B/C, as compiled by Government Technology Services Inc.

Konica Camera Adds Storage

Data storage in digital cameras has just gone up a notch. Konica U.S.A. Inc. is the first to utilize Intel Corp.'s Series 100 Flash Memory Miniature Card in its new Q-EZ digital camera.

The Series 100 card is based on standards set by the Miniature Card Implementers Forum and is designed to provide low-cost data storage for portable electronic systems such as digital cameras, smart cellular phones, audio recorders and handheld PCs. The matchbox-size card comes in 2M and 4M versions and can be inserted

See OFF THE SHELF, Page 10

*I*t's not a year 2000 problem.
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Oracle's database, tools and applications are Y2K compliant.

The fact is, if you haven't started an assessment of your year 2000 problem by now, you're behind. By 1998, you should already be implementing your solution and testing it. Is it too late to start? Not if you call Oracle today. We can help you survive the year 2000 because our database, tools and applications are all compliant. Plus, Oracle has consulting services to help you assess, plan and implement. Oracle can prepare your systems not just for the year 2000, but for the next millennium. So before time runs out, call Oracle at 1-800-633-0584, ext. 7199.

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OFF THE SHELF, from Page 8

or removed hot or cold.

The camera's resolution is 640 by 800 pixels; however, picture detail can vary when using the Series 100 card. Q-EZ users can store 32 images at normal quality/maximum compression (each compressed image taking up 59K), 16 images at medium resolution/medium compression (119K/image) and four images at fine quality/minimal compression (499K/image).

The Q-EZ features sharp auto-focus and auto "white balance" for adjustment in daylight, mixed, fluorescent or tungsten light. The 44mm-equivalent unit comes standard with an F2.8 High-Performance Lens and features an electronic shutter that can capture pictures at speeds up to 1/2,000 of a second.

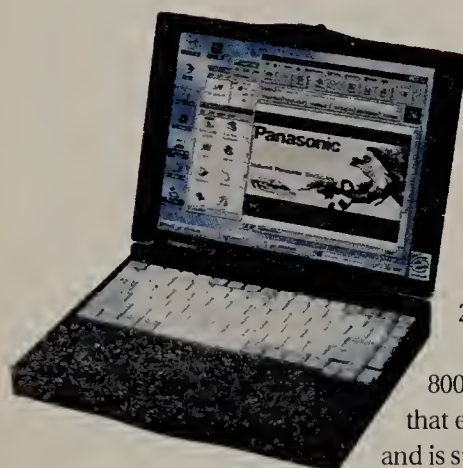
Adobe PhotoDeluxe software is included in the package. Konica also provides software that enables digital camera users to make their own PC photo album.

"The rugged design of this camera makes it good for more industrial applications," said Paul Gordon, marketing director of Konica U.S.A.

For more information about the Q-EZ, contact Konica at (888) 7KONICA or visit its Web site at www.konica.com. For more information about the Series 100 card, visit Intel's Web site at www.intel.com.

— Joshua Dean

Panasonic's Slimline Traveler



Government professionals who need to take the office with them wherever they go should consider Panasonic Personal Computer Co.'s 4.9-pound wonder: the CF-35. The slimline notebook is 1.5 inches high and has many of the same components as Panasonic's ruggedized CF-25 [GBB, April 14].

The CF-35 features a 12.1-inch, 800-by-600-pixel SVGA DayBrite LCD that eliminates indoor and outdoor glare and is surrounded by a magnesium-alloy case that is 20 times stronger than the industry-standard plastic.

The CF-35 has two flavors of CPU: an Intel 150 MHz MMX Pentium or an Intel 133 MHz Pentium. The unit comes standard with 16M of EDO RAM and is expandable to 80M. The 2.16G or 1.44G hard disk is mounted in high-tech, shock-absorbing gel.

In addition to its rugged features, the CF-35 comes with password security and an integrated Kensington lock slot for the theft-conscious user. Travelers will also like the wireless networking versatility that the unit's Infrared Data Association (IRDA) port offers. Along with the unit's stereo speakers and 16-bit sound quality, the CF-35 can take two Type II or one Type III PC Cards. Software includes pre-loaded Windows 95, power management utilities and TranXit v3.0 PrintPro IRDA Port software control.

Panasonic claims the battery will last five and a half hours based on independent battery testing conducted by VeriTest, Santa Monica, Calif.

The CF-35 comes standard with a 3.5-inch floppy drive and offers an optional 10X CD-ROM drive. "In the government, the life cycle for a laptop is about 18 months," a spokesman for Panasonic said. "This is the



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MEMORY

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CD-ROM

10X to 16X

VIDEO CARD

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MONITOR

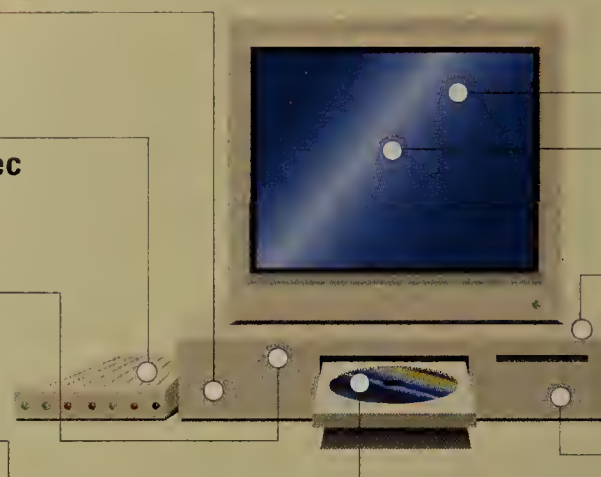
15"

CPU

200 MHz Pentium MMX

ACCESSORIES

Sound capability and
10/100 Ethernet adapter



sort of product that can push that further."

For more information about the CF-35, contact Government Technology Services Inc.'s Jan Ruderman at (800) 999-4874 or go to Panasonic's Web site at www.panasonic.com.

— Joshua Dean

IBM and HP Slash Color Printer Prices

IBM Corp. and Hewlett-Packard Co. quietly began cutting prices on their color laser printers during late May and early June.

Since our color laser printer review in February [GBB, Feb. 3], HP has dropped its prices on the Color LaserJet 5M by up to 26 percent. The system we tested in February was priced at \$6,921 and included 36M of memory. HP is now offering the Color LaserJet 5M in its standard configuration (4M of memory) for \$4,656 on NASA's SEWP II contract. The additional 32M of memory will cost you \$460, for a total price of \$5,116.

IBM has also joined in the price cutting, with a reduction of 38 percent on its Network Color Printer. Before IBM's May 21 announcement, the Network Color Printer was available from GE Capital ITS Federal Systems for \$7,057 on the GSA schedule. The system is now available for \$4,342.

For more information on either the Color LaserJet 5M or the Network Color Printer, visit the companies' Web sites at www.hp.com or www.ibm.com. IBM customers can also contact GE Capital ITS Federal Systems at (800) 374-9434.

— Daniel M. Verton

Procom Unveils First DVD/CD-ROM Server

On May 5, Procom Technology Inc., Irvine, Calif., announced what it calls the "world's first mixed-ROM Server": the DVD/CD Force 14-Server. The Force 14-Server provides network clients with access to information stored on DVD-ROM and CD-ROM across multiple network protocols. According to Procom, the DVD/CD Force 14-Server is the first in a series of DVD-ROM products under development by the company; it was

scheduled to begin shipping in June.

The Force 14 can hold up to 13 DVD-ROM (4.7G) drives and one CD-ROM (650M) drive for a total storage capacity of 61.7G. The system is based on the same feature set and design of the CD Force 14-Server from Procom except for the incorporation of the DVD-ROM drives. It also ships configured to run over Ethernet, Fast Ethernet, Token Ring, FDDI or CDDI. In addition, by using the same design as the CD Force 14-Server series, the new DVD/CD model is able to provide access to DVD/CD libraries over heterogeneous environments such as Windows 95, Windows NT, Windows for Workgroups, OS/2 and Unix.

Industry experts believe that DVD technology will soon replace CD-ROM as the storage medium of choice for multimedia data. However, because the first generation of DVD-ROM drives cannot read CD-ROM media, Procom has retained one CD-ROM drive in the DVD/CD Force 14-Server's design to enable systems administrators to load management software and as a means of protecting future investments. According to Page Tagizad, a product manager with Procom, "there is a lot of work in progress for software publishers to go from CD to DVD, which will be taking place in 1998 and 1999. Our DVD/CD Force 14-Server is [designed] for early investors to protect their investments."

Tagizad further stated that Procom's current DVD system will be used mostly for CD-ROM retrieval until such time as DVD reference material becomes more widely available. Once that happens, Tagizad said, those organizations that invested in a system such as the DVD/CD Force 14-Server early on "will have an upward-compatible [scalable] system."

Government buyers can find the DVD/CD Force 14-Server on the GSA schedule from GE Capital ITS for \$12,499. For more information, call Procom at (714) 852-1000 or visit its Web site at www.procom.com.

— Daniel M. Verton



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A: www.procom.com/government

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Shana's Informed

Automated Forms for PCs and Macs

BY LINDA ROHRBOUGH

A new player on the automated forms scene is attracting attention: Shana Corp., which has ported its Informed Designer and Filler to Windows from its native Power Macintosh platform. The product recently was added to a NASA-wide PC contract, and we wanted to see why.

Like most forms software, Informed comes in two parts: the Designer package and the Filler package. Purchase of Designer includes a single licensed copy of Filler.

The Windows version of Informed retains the look and feel of a Macintosh product, which means PC users must learn some new terms.

The major strengths of the Informed products are cross-platform PC, Macintosh and Power Macintosh capability for forms and data; database connectivity, including SQL databases; and spell-checking. Other features you'd expect in a good forms software product are also included, such as masks and data accuracy checking, the ability to import graphics, routing and tracking of forms, digital signatures, auto-incrementing fields and logic functions.

Installation

Shana says the Informed Designer and Filler require at least a 386-based PC running Windows 3.x, NT or 95, with 8M of RAM and at least 8M of free disk space. This is misleading because the Filler alone in a minimal configuration requires 8M of hard disk space. The Designer wants another 11.5M. With the Open Database Connectivity (ODBC) drivers, both products take up about 25M of hard disk space.

On the Macintosh, the product requires System 7.0 or later, a minimum of an SE/30 (68030 processor) with at least 8M of RAM and 4M of free hard disk space. On the Power Macintosh, System 7.1 or later is required. The Macintosh version of Designer allows forms creation for the Newton Personal Digital Assistant via special templates, but a special version of Filler is required to fill out forms on the Newton.

The Mac and Windows versions come on a single CD-ROM. The same CD-ROM is distributed regardless of whether Designer or Filler is purchased, but if Filler is purchased, then access to Designer is prohibited. If Designer is purchased, then both packages can be installed.

I installed Designer and Filler Version 2.0.1 onto a 75 MHz Pentium PC running Windows 95. Installation was easy, although Designer and Filler each require separate installation and rebooting of the PC. The only problem I found was when I decided to install the optional ODBC drivers for Designer and Filler. During the Filler installation, I received an error message that an ODBC driver was in use and could not be copied over.

Designing and Filling Forms

Right off the bat, PC users will find new terms to deal with using Designer. Instead of "field," the term is "cell," so field labels are "cell names," and tables are "cell

tables." I found it easy to create forms using graphical tools that look much like the tools in PC Paintbrush. Informed is object-oriented, meaning you create or select an object, and then you can perform functions on that object or change the attributes of the object. For example, the cell name and the cell are created at the same time, and a right-button mouse click brings up a list of attributes for the cell. By picking items from this list, you can type in information the user will see when filling out the form.

Cell attributes include changing the cell name, font, size and color as well as the location of the label in relation to the cell. You can choose the type of data that should be accepted and a mask for the data by entering



a list of acceptable choices for the cell, make the cell a check box, compare the data entered to a predetermined set of calculations to check it for accuracy and so on. Many of the attributes are context-sensitive. For example, when I chose Date for the format of a cell, I was presented with a list of date formats or masks to choose from, such as MM/DD/YY.

I found tables just as easy to create. Canned formulas for common calculations are available as well as custom formulas. Radio buttons, action boxes, logos and graphics can also be included in forms.

It also was easy to control the way the user moves through the form by controlling the tab order. The tab order also can be controlled by logical If-Then-Else statements. For example, if the user selects "married" as his marital status, the tab order can take him through the spouse information cells, but if he selects "single," then those cells are skipped. A number of programming-type functions are included in Designer for the creation of "intelligent forms" to allow for identifying logical relationship functions, automation and calculations.

A welcome addition is the spell-checking that is available in Designer and Filler. I could add words to the spell-checker's vocabulary as well.

Features

The Informed products let you pull data and create lists from a variety of external databases, including Oracle and Sybase databases. With ODBC support, the list of supported databases includes: Clipper, dBase, DB2, FoxBase, Gupta, Informix, Paradox, Microsoft SQL Server and NetWare SQL. Incremental numbers for forms can be obtained from a central database source.

Routing is a strong feature of Shana's software. Distribution is available via all the popular mail packages, including Microsoft Corp.'s Exchange, Microsoft Mail, Novell Inc.'s GroupWise, Eudora Pro, Lotus Development Corp.'s cc:Mail, Banyan Systems Inc.'s VINES IM-compliant mail packages and MHS Mail as well as MAPI-compliant mail programs.

The route the form will take is built into the form itself. Notes, like electronic Post-it Notes, can be "stuck" to forms en route for other users to read or as reminder messages.

Security is accomplished via digital signatures. If a

form has been tampered with, a validation function can look at the digital signature to tell if the data has changed since the form was signed. The digital signatures are plug-in modules supplied with the product.

Forms that can be used on the Internet are also included. Shana plans a version of Filler that companies can license for users to download from the Internet along with a form. The Filler can be used to fill out the form, and then the form can be sent back automatically. Meanwhile, users keep the copy of Filler they've downloaded and use it without charge, company officials said.

Shana also added the ability to import forms created in Delrina Corp.'s popular PreForm Pro.

Free Evaluation and Version 2.0.3 Updates

You can get a free 30-day evaluation of Informed Designer and Informed Filler versions 2.0.2. The evaluation version is available for either the PC or Macintosh platform from Shana's Web site at www.shana.com. Or for a \$15 shipping cost, you can order the Informed Designer/Filler Evaluation CD from the company's toll-free order line at (800) 386-7244.

In addition, free updates to version 2.0.3 of the Designer and the Filler products are also available from the Web site. Version 2.0.3 offers faster speed opening data files, adding records and moving between records; auto-mounting and dismounting of servers when using ODBC; and MIME messages via HTTP.

Conclusion

If cross-platform support between PCs and Macs of electronic forms is important, Shana's Informed Designer and Filler is a good choice. This product has the feel of software designed and implemented by people who've actually performed the form building and form filling tasks. ◀

Award-winning author Rohrbough received the "Best Nonfiction Computer Book" award for 1994. She is the author of Upgrade Your Own PC (IDG, 1996), Start Your Own Computer Repair Business (McGraw-Hill, 1995) and Mailing List Services on Your Home-Based PC (McGraw-Hill, 1994). She can be reached at 75570.3235@compuserve.com.

REPORT CARD

Informed Designer and Filler

Shana Corp.
(800) 386-7244
www.shana.com

Price and Availability

Shana's electronic forms products are available on the Personal Computer Acquisition Contract at NASA's Kennedy Space Center. The price for a single-user copy of Designer is \$149; Filler is \$70. The price for 100 users is \$4,700. For more information, check out the Web site at pcac.ksc.nasa.gov.

Remarks

Shana's Informed Designer and Filler products offer cross-platform capability and a Macintosh look and feel. Once PC users adjust to the product's terminology, they'll find a rich set of features for building intelligent forms with database connectivity, routing and security.

Final Score

Excellent

A+



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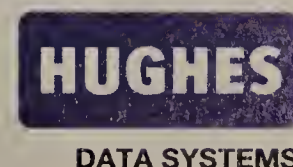


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- Mini Tower Chassis
- 2 Universal Serial Bus (USB) Ports
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- MS Windows NT® Workstation 4.0
- MS IntelliMouse
- 3 Year Limited Warranty† with 1 Year of Next-Business-Day On-Site^Δ Service

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Product Code #550014

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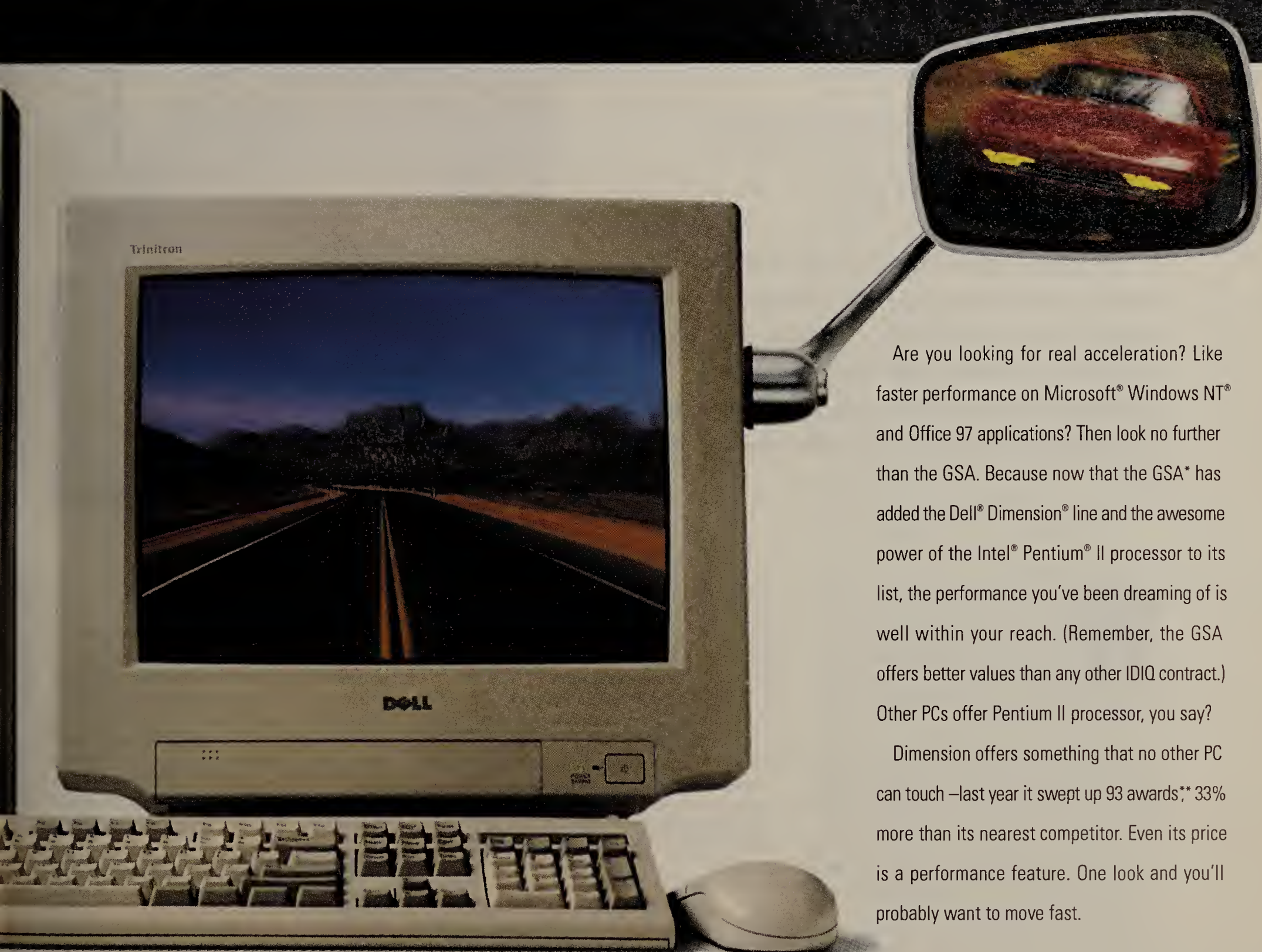
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- 1000LS Monitor (15.7" v.i.s.)
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- Yamaha 32 Wave Table Sound
- 512KB Internal L2 Cache
- 24X Variable EIDE CD-ROM Drive
- Mini Tower Chassis
- 2 Universal Serial Bus (USB) Ports
- Iomega Zip 100MB IDE Internal Drive with One Cartridge
- Microsoft Office 97 SBE/MS IntelliMouse
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*Some mods still pending GSA approval. **According to the top 5 PC publications. †For a complete copy of our limited warranties, please write Dell USA L.P., One Dell Way, Round Rock, TX 78682, Attn: Warranties. Prices and specifications valid in the U.S. only and subject to change without notice. ‡On-site service provided by an independent third-party service provider. May not be available in certain remote areas. MS, Microsoft, Windows and Windows NT are registered trademarks of Microsoft Corporation. The Intel Inside logo, and Pentium are registered trademarks and MMX is a trademark of Intel Corporation. 3Com and EtherLink are registered trademarks of 3Com Corporation. Trinitron is a registered trademark of Sony Corporation. Dell, the Dell logo and Dimension are registered trademarks and DirectLine is a service mark of Dell Computer Corporation. Rear-view mirrors not included with system. Other trademarks and names may be used to refer to either the entities claiming the marks and names or their products. Dell disclaims proprietary interest in the marks and names of others. ©1997 Dell Computer Corporation. All rights reserved.

13 Desktop Deals

The Best All-Around Systems on the Schedule

▶ WRITTEN BY DANIEL M. VERTON
▶ TESTING BY ANDREAS UITERWIJK,
CHARLES PETTIROSSI
AND ROSS ARMSTRONG

In our biggest comparison ever, the FCW Test Center evaluated more than 20 desktop PCs — some running on Intel Corp.'s 200 MHz Pentium processor with MMX technology and others running on Advanced Micro Devices Inc.'s (AMD) 200 MHz K6. In the end, 13 systems received our nod.



With the arrival of another summer buying season comes renewed interest in the mainstay of the federal IT market: the desktop computer. This year's standard PC purchase will be a 200 MHz-class system. We reviewed 20 of them to give you the broadest range of choices.

The competitors include corporate machines from top-tier vendors such as Dell Computer Corp., Compaq Computer Corp., IBM Personal Computer Co. and up-and-coming Micron Electronics Inc., as well as several smaller vendors, such as SMAC Data Systems Inc. and Comark Government and Education Sales Inc., that offer solid, affordable alternatives. Fifteen of the systems we reviewed had Pentium processors, while five featured AMD's new K6 processors.

The arrival of the K6 is good news to government buyers because it is expected to force Intel Corp. to lower its prices on its Pentium MMX and Pentium II processors (GBB, June 2). The best of the K6 systems were Dunn Computer Corp.'s Dunn K6 200, which tied for 7th place, and Inteva Microsystems Inc.'s Inteva K6 200 Multimedia, which finished in 10th place but led the field in benchmark performance.

One trend we noticed among the high-profile corporate systems was compliance with Desktop Management Interface (DMI), a standard that allows network administrators to manage desktop clients remotely. In addition, more vendors are bundling network management applications with their systems and are shipping machines with video and networking integrated into the motherboard design. These vendors are trying to address buyers' concerns about the total cost of ownership for PCs by making it easier to manage and administer their systems.

Other vendors are trying to appeal to buyers with

advanced features such as Zip drives, Universal Serial Bus (USB) ports, 12X or faster CD-ROM drives, infrared ports, cache-upgrade modules, simultaneous use of SIMM and DIMM memory sockets, and advanced graphics card configuration utilities.

We also discovered significant differences in the quality of vendor technical support and support policies. Over the last several years, government buyers have come to realize the importance of receiving quality technical and warranty support from vendors supplying them with large numbers of systems. It's no surprise, therefore, that the top three systems in our review all received scores of excellent for these two categories.

The Results

We recommend any PC that scores above 7.00 on our scale from 1 to 10. In this comparison, the top 13 systems scored between 7.00 and 8.02. The systems that ranked 14 through 20 posted too many satisfactory scores to be competitive.

With a final score of 8.02, the Millennia MME P200 from Micron Electronics Inc. edged out Dell's OptiPlex GXi to walk away with our Best Buy Award. Excellent support policies and technical support, a very good feature list and a tie for second place on the performance benchmark helped the Micron system capture top honors.

The second-place Dell system also did well, earning excellent scores in three categories, but it finished in 14th place on the performance benchmarks, a category in which Dell usually does very well. Dell's final score was 8.00 on our scale from 1 to 10.

Finishing close behind the Dell machine in third place was Digital Equipment Corp.'s Venturis FX-2 5200M with a score of 7.98. The Venturis led the pack with excellent scores in four categories. Unfortunately,

it, too, suffered from a lower performance score and only a satisfactory feature list.

The rest of the top 13 systems were: IBM's PC 350; SMAC Data Systems' SMAC Data System 200MMX; Compaq's Deskpro 6000 MT; Toshiba America Information Systems Inc.'s Equium 5200D; Dunn's Dunn K6 200; Comark Government & Education Sales' Plus Data Systems unit; Acer America Corp.'s AcerPower; Intergraph Federal Systems' TD-25; Inteva's Inteva K6 200 Multimedia; and EPS Technologies Inc.'s Evolution "G" Series.

To evaluate these systems, we ran Business Applications Performance Corp.'s SYSmark/32 benchmark. The

AT A GLANCE

PCs

Pricing

Prices range from \$1,826 to more than \$3,600 on the GSA schedule.

What's Selling

Systems that were considered high-end a year ago have found their way to basic end users.

Where to Find Bargains

Smaller vendors generally will have the lowest prices, but they may not be able to provide the same level of support as the top-tier vendors.

What to Specify

Look for expandability in terms of PC Cards, memory and available drive bays as well as integrated networking and DMI-compliance. Investigate your video card options carefully based on the type of work you will be doing.



average SYSmark/32 performance score was 182 for the entire field of 20 systems, with the AMD-powered system from Inteva leading the way with a score of 207 and the system from Global Insync Inc. trailing behind in last place with a score of 148. For more information on where each system placed in the review, see the chart starting on Page 18.

The Top 13

Millennia MME P200

In addition to earning scores of excellent in support policies and technical support, the Micron Millennia MME P200 received very good scores for system design, features and expandability — three important categories to consider when buying a new desktop computer.

The Millennia is based on a 200 MHz MMX processor from Intel with 512K of pipeline burst SRAM cache memory. Overall, the layout and design of the system was very good. A sliding side-access panel provides easy entry into the chassis, and there's plenty of room inside for adding or removing components. Rounding out a solid system design was the incorporation of two USB ports for future peripheral expansion.

Although a quick-start guide did not accompany the Millennia, its ports and cable connectors were labeled clearly for easy installation. We didn't find any special system or networking utilities to help with setup or configuration, but multimedia and Zip drive applications were provided on CD-ROM and floppy disks. Overall, Micron earned a score of good for setup.

The Millennia also boasts a relatively robust feature set. Included were a 3.1G hard drive, a 33.6 kilobit/sec data/fax modem, a 16X CD-ROM drive, Diamond Stealth 3D 2000 Pro video card with 4M of VRAM and a pair of desktop speakers. Micron was also the only vendor to include a 100M Zip drive. Overall, the Millennia's features list earned a very good score.

Expandability was another category in which the Millennia posted a score of very good. After factory configuration there were four expansion slots available for additional cards, and two external drive bays were open. In addition, the system's 16M of standard SDRAM can be upgraded to 256M along with a maximum video memory of 8M. The Millennia's one drawback was its one available internal drive bay after factory configuration.

The Micron system tied the system from Compaq for second place with a final score of 193 on the SYSmark/32 benchmark. Its strongest score was in desktop graphics, where it posted a 372. The rest of its SYSmark/32 results were solid and highly competitive.

At \$2,478 on the open market (GSA pending), the Micron Millennia MME P200 is priced in the middle of the field but offers a very good feature list, top-of-the-line performance and ample expandability. In addition, should you run into any problems, Micron's 24-hours, seven-days-per-week, government-only technical support will provide you with top-notch service. Bottom line: This system delivers.

OptiPlex GXi

The OptiPlex GXi from Dell was one of only three systems to earn a score of excellent for system design, thanks mostly to its superior modularity and integrated video and networking.

The OptiPlex's design is highlighted by a quick-release case cover as well as easy snap-out drive bays, power supply and expansion slot board. Once inside, we found a 3Com 10/100 Fast Ethernet controller inte-

grated on the motherboard, along with integrated Sound Blaster Pro-compatible audio. Although Dell integrates an S3 Trio 64 V+ video controller (2M of memory) on all GXi models, our system shipped with an optional Matrox Graphics Inc. Millennium card with 4M of memory. A total of seven expansion slots and three external drive bays, along with two USB ports, are also included in the OptiPlex's design.

Less-experienced government users will appreciate the very helpful quick-start guide that accompanies the OptiPlex. Dell also installs a full complement of on-line documents to assist with system setup and configuration. More importantly, system administrators will like the fact that it arrives pre-configured for network use. When all was said and done, the Dell system walked away with a score of good for setup.

The OptiPlex's feature set also earned Dell a score of good. In addition to the integrated audio, video and networking mentioned above, our system shipped with a 2.1G hard drive, 512K of cache memory (although users have a choice of 256K), an 8X CD-ROM (16X is also available) and a pair of desktop speakers that sport a subwoofer for an enhanced multimedia experience.

Expandability was one of the OptiPlex's stronger points, earning it a score of very good. Although there were four expansion slots available after factory configuration, the OptiPlex was not as strong in terms of available drive bays, with only one external and one internal drive bays open. It was also one of only two systems capable of handling up to 512M of ECC EDO RAM. However, users should note that only 128M is possible using DIMM memory. In addition, the 4M of video memory on the Matrox Millennium graphics card can be expanded to 8M.

The Dell's performance results on the SYSmark/32 benchmark were far from what we expected. The OptiPlex posted a mediocre final score of 174. In addition, its best score of 266 in desktop graphics was more than 100 points below the Micron machine.

As usual, Dell was a solid contender. The OptiPlex is a well-designed system priced competitively at \$2,398 on the GSA schedule. However, if you need a faster, more powerful performer for graphics-intensive work, the OptiPlex may not be your best choice due to its slower performance results.

Venturis FX-2 5200M

The Venturis was the only system to post scores of excellent in four categories: compatibility, documentation, support policies and technical support. It is interesting to note that despite a slightly higher price, satisfactory feature set and a 12th-place finish on the SYSmark/32 benchmark tests, scores of excellent in these key categories were almost enough to put it over the top. Its overall score was 7.98.

The Digital system fared well in system design, earning a score of very good for the category. The case comes in a nice modular form factor requiring the removal of three simple thumbscrews to gain access to internal components. In addition, Digital has incorporated a "slide-in, slide-out" motherboard that is attached to the chassis with two quick-release latches. Built-in video support and two USB ports also are integrated into the Venturis' design.

The Venturis doesn't ship with a quick-start guide, but its port and cable connections are all labeled clearly to make setup easier. Several diagnostic utilities from American Megatrends Inc. also were loaded on our system, along with a full set of on-line documents and a complete system-rescue CD. For network manageability, Digital includes its own ClientWORKS DMI manageability software. Overall, we gave the Venturis FX-2 a

THE CONTENDERS



Acer America Corp.'s AcerPower, available on the GSA schedule. **Score: 7.10**

Comark Government & Education Sales Inc.'s Plus Data Systems, available on the GSA schedule. **Score: 7.27**

Compaq Computer Corp.'s Deskpro 6000 MT, available on the GSA schedule. **Score: 7.60**

Dell Computer Corp.'s OptiPlex GXi, available on the GSA schedule. **Score: 8.00**

Digital Equipment Corp.'s Venturis FX-2 5200M, available on the GSA schedule. **Score: 7.98**

Dunn Computer Corp.'s Dunn K6 200, available on the GSA schedule and soon to be on SASS II. **Score: 7.27**

EPS Technologies Inc.'s Evolution "G" Series, available on the GSA schedule and the Air Force Non-Appropriated Funds contract. **Score: 7.00**

Global InSync Inc.'s InSync, available on the GSA schedule. **Score: 6.50**

IBM Personal Computer Co.'s PC 350, available on the GSA schedule. **Score: 7.67**

Intergraph Federal Systems' TD-25, available on the GSA schedule, Navfac CAD-2, Navsea CAD-2 and the Navair/Spawar CAD-2 Contract. **Score: 7.09**

Inteva Microsystems Inc.'s Inteva K6 200 Multimedia, available on the open market through Riodan & Ross Distribution Inc. (GSA pending) and on the JCALS contract. **Score: 7.02**

Magitronic Technology Inc.'s Magitronic G-K6200-FMX-4, available on the GSA schedule. **Score: 6.71**

Micron Electronics Inc.'s Millennia MME P200, available on the open market (GSA pending). **Score: 8.02**

Micronics Computers Inc.'s Nucleus Pentium MMX, available on the GSA schedule and the NIH Electronic Computer Store. **Score: 6.91**

Nexar Technologies Inc.'s Nexar II, available on the GSA schedule, NIH Electronic Computer Store, Energy Department BPA and Treasury Department TDA. **Score: 6.70**

NYMA Inc.'s NYMA Pentium MMX, available on the GSA schedule. **Score: 6.27**

Pantex Computer Inc.'s Amera 200/A, available on the GSA schedule. **Score: 5.96**

SMAC Data Systems Inc.'s SMAC Data System 200MMX, available on the GSA schedule. **Score: 7.67**

Toshiba America Information Systems Inc.'s Equium 5200D, available on the GSA schedule. **Score: 7.51**

V-Squared Inc.'s 200 MHz K6 System, available on the GSA schedule. **Score: 6.17**

score of very good for setup.

Digital didn't fare as well in the features category, posting a score of satisfactory. Although it arrived with a 3G hard drive, the system's 256K of cache memory and 1M of SGRAM video memory were well behind the rest of the field. A built-in sound card is optional, but Digital did not ship one with our evaluation unit. A 12X CD-

See **DESKTOP**, Page 26

200 MHz PCs Compared



Products receive ratings from excellent to unacceptable in certain categories. Scores are derived by multiplying the weighting of each criterion by its rating, where:

- ★★★★ = Excellent = 1.0 Outstanding in all areas
- ★★★ = Very Good = 0.8 Meets all essential criteria and offers significant advantages
- ★★ = Good = 0.6 Meets essential criteria and includes some special features
- ★ = Satisfactory = 0.4 Meets essential criteria
- ★ = Poor = 0.2 Falls short in essential areas
- = Unacceptable = 0.0 Fails to meet minimum standards or lacks a feature

Scores are summed, divided by 100 and rounded down to two decimal places to yield the final score out of a maximum score of 10.0 (plus bonus). Products rated within 0.2 points of one another differ little.

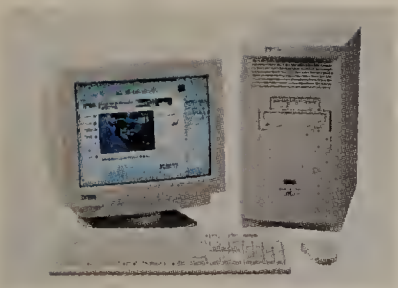
Configuration Requested

- 32M of RAM
- 2G to 3G hard drive
- 17-inch monitor
- Windows 95

Processor Picks

- ◆ Pentium chip
- + K6 chip

Company	WEIGHTING	AcerPower ◆ Acer America Corp. (800) SEE-ACER www.acer.com/aac	Plus Data Systems ◆ Comark Government & Education Sales Inc. (888) 426-6275 www.cges.com	Deskpro 6000 MT ◆ Compaq Computer Corp. (800) 652-6672 www.compaq.com	OptiPlex GXi ◆ Dell Computer Corp. (800) 289-3355 www.us.dell.com/federal
SYSmark/32	175	181	175	193	174
System Design	75	★★★ The system is designed with a cache-upgrade module. The motherboard is easily removable, as are the floppy drives. Acer's "screwless" computer housing makes accessing the internal components very easy. The inside of the chassis is a little cramped. Infrared is supported on the motherboard but was not operational.	★★★ System chassis comes in a standard layout with no bells and whistles. The design provides easy-to-access internal components but lacks modularity and quick-release features. The design of the rear bezel has not changed; it is still very difficult to pry off. Two USB ports also are included in the design.	★★★ A side-access panel and thumb-screws make cover removal a snap. An Adaptec 2940 Ultra SCSI host adapter came bundled with our system. System is designed in a modular fashion with an easy slide-out motherboard and expansion card cage. The design also incorporates built-in networking and a port for an external infrared transceiver.	★★★★★ Highly modular system with easy-to-remove components. Quick access to internal components via a quick-release cover improves user serviceability. Modularity is highlighted by quick-slide-out drive bays, power supply and expansion slot board. Integrated audio, video and networking. Can be configured for standard desktop or minitower.
Setup	75	★★★★ No quick-start guide. Clearly labeled ports and connections. System came with 64M of RAM, forcing us to remove 32M for testing. Useful hard drive recovery utility ships on CD. System is DMI-compliant, but management software not bundled.	★★ No quick-start guide. The system's connectors are labeled clearly. The operating system is only partially loaded. Microsoft Windows 95 and Plus applications are provided on a CD-ROM along with various Matrox Millennium applications and utilities.	★★★★ No quick-start guide, but system comes with a Windows NT installation guide and some extra system utilities for backup, emergency rescue and system status/configuration info. Ships pre-configured for network use.	★★★ Our system shipped with a very helpful quick-start guide and on-line documentation. The system's port connections were labeled clearly. The system comes pre-configured for network use and bundles a helpful disk-maker utility.
Features	100	★★★ Ships with one of the faster CD-RDMs (20X). Also comes with a spacious 3.5G hard drive. Cache memory is split between 256K on the motherboard and another 256K loaded in an upgrade module. A pair of desktop speakers and some personal-productivity software are included.	★★ An average feature set for a solid system. The list includes a 2.5G hard drive, 256K of cache memory soldered to the motherboard, a 12X CD-ROM drive, a 64-bit graphics engine with 2M of memory and a pair of desktop speakers. Users will find Microsoft's Plus software very useful.	★★★★ Ships with a hefty 4.2G hard drive, 512K of cache memory, an 8X rewritable optical PD/CD combo drive, built-in networking, 64-bit PCI graphics engine with 2M of VRAM, several system diagnostic and management applications, and system backup software.	★★★ Included was a 64-bit video engine with 4M of memory. Our unit shipped with a 2.1G hard drive, 512K of cache memory, built-in networking and desktop speakers with a subwoofer. The drawbacks include a slower CD-RDM drive (8X) and a minimal set of application CDs.
Expandability	75	★★★★ Four free expansion slots. Excellent memory expansion (384M) with 4 SIMM sockets available after factory configuration. CPU cache can be upgraded to 512K via a separate upgrade module.	★★★★ System lacks in memory expandability (128M). However, it provides 5 expansion slots and 3 free drive bays. Although video memory can be expanded to 8M, the system cache is limited to 256K.	★★★ The Compaq system has 4 free expansion slots available after factory configuration but only 2 external drive bays and no internal bays. System memory can be expanded up to 256M. In addition, video memory can be upgraded to 8M.	★★★★ Four free expansion slots available. Video memory can be expanded to 8M. Ships with 512K cache memory and offers up to 512M of ECC EDO RAM (128M of EDD RAM). One external and 1 internal free drive bays after factory configuration.
Compatibility	75	★★★ Windows 3.xx, Windows 95, DDSxx.	★★★ Windows 3.xx/95/NT, DOSxx.	★★★★★ Windows 3.xx/95/NT, DOSxx, OS/2, Unix.	★★★ Windows 3.xx/95/NT, DOSxx.
Documentation	75	★★★ Documentation is easy to read and makes good use of various naming conventions throughout to denote key facts.	★★★★★ Illustrations are used extensively. The chapter on trouble-shooting is very well done. We also liked the glossary and acronym definitions.	★★★★ Very high-quality documentation. Has an entire chapter dedicated to trouble-shooting. Diagrams are of very good quality.	★★★★ Very thorough documentation that includes an excellent trouble-shooting guide. However, a glossary was noticeably absent.
Technical Support	75	★ Average hold time was 4 minutes. Technicians were not very helpful. They were more concerned about whether we were authorized to get service than about customer support.	★★★★ Hold times were minimal. Technicians were knowledgeable, and they walked us through our problems very easily.	★★★ Although hold times averaged about 20 minutes per call, technical support was good. You will need to register your system before you can get through to a technician.	★★★★★ Minimal hold times. Technicians were knowledgeable and quick with answers, and they were willing to stay on the line until a solution to our problem was found.
Support Policies	100	★★★★ 3 years 1 year No Yes Yes None	★★★ 3 years 3 years; fee-based 30 days No Yes Internet	★★★★★ 3 years 1 year None Yes Yes AOL, CompuServe, in-house BBS, Internet, Prodigy 24 hours, 7 days	★★★★★ 3 years 1 year 30 days Yes Yes AOL, CompuServe, in-house BBS, Internet, MSN, Prodigy, Usenet News 24 hours, 7 days
Warranty					
On-Site Service					
Money-Back Guarantee					
Fax-Back Support					
Toll-Free Line					
Other Support					
Support Hours		24 hours, 7 days	8 a.m. to 5 p.m., M-F (CST)	24 hours, 7 days	24 hours, 7 days
GSA Price (as of May 30)	175	\$2,179	\$1,947	\$3,680	\$2,398
Reseller/Prime		CGES	CGES	Compaq	Dell
GSA No./Contract		GS-35F-4044D	GS-35F-4044D	GS-35F-4544G	GS-35F-4076D
Phone		(800) 321-CGES	(800) 788-4688	(800) 727-5472	(800) 727-1100
Final Score	1000	7.10	7.27	7.60	8.00
Remarks		Improvements are needed in technical support, which could have helped this otherwise solid system fare much better than eighth place.	A low price puts this machine in the top five most affordable systems. Improvements in setup and more features will help this unit make a push for first place.	At \$3,680, this was the most expensive system in the review. Still, it was a solid contender that could have easily threatened the leaders with better scores in design, expandability and technical support.	Not the fastest machine of the field, but a solid contender as usual, with excellent vendor support.



Venturis FX-2 5200M ♦		Dunn K6 200+		Evolution “G” Series ♦		InSync ♦		PC 350 ♦	
Digital Equipment Corp. (800) 700-5899 www.windows.digital.com		Dunn Computer Corp. (800) 296-DUNN www.dunncomp.com		EPS Technologies Inc. (800) 551-1727 www.epstech.com		Global InSync Inc. (703) 913-2400 www.globalinsync.com		IBM Personal Computer Co. (800) 426-4968 www.pc.ibm.com	
177	149.64	183	153.02	191	161.47	148	125.12	190	160.63
★★★★	60.00	★★★	45.00	★★★	45.00	★★★	45.00	★★★★★	75.00
The system’s modular design makes internal access very easy. In addition, the motherboard is anchored with two quick-release latches. Dur system came ready for an optional built-in sound card. The built-in video card was powered by only 1M of VRAM. Users will be able to take advantage of two USB ports.		We particularly liked the ergonomically designed keyboard and the lockable hard drive. The hard drive and motherboard are mounted on a removable back panel. Unfortunately, the system’s memory sockets are obstructed by the power supply. Two USB ports also are included.		Access is provided via one side of the chassis only. However, system and video memory are easy to access. This system does not have any particularly modular components. In fact, you must remove the hard drive housing from the chassis before you can unscrew the drive. DIMM and SIMM sockets are used in this system.		Motherboard equipped with module for upgrading cache memory. But I/O ports are connected to motherboard via cables, hampering memory accessibility. System also had USB available on motherboard, but connectors were not provided. Stereo speakers provided in 5.25-inch drive bay are connected to sound card via external jumpers.		This system can be configured either as a minitower or desktop. System memory is located on a vertical riser card for good modularity. The hard drive also can be removed very easily. We particularly liked the user-upgradable cache and locking front panel to secure the external drive bays. Two USB ports are also included.	
★★★★	60.00	★★	30.00	★★★	45.00	★★★	45.00	★★★★	60.00
No quick-start guide. The system’s cable connections are labeled clearly, and several diagnostic utilities are bundled. Although the system was not network-ready, it was DMI-compliant. On-line documentation and a complete rescue CD-ROM are provided.		System arrived with Windows 95 pre-installed. A very straight-forward system with no bells or whistles. No quick-start guide, but all ports and connectors are labeled clearly. Advanced video card configuration management software included.		No quick-start guide is provided, but the system is network-ready and provides on-line documentation for audio and graphics cards as well as drivers for LAN card. Good labeling of peripheral connectors.		Ships with support for enhanced graphics settings on CD-ROM. Utilities are provided for Win95, 3.1, WFW, NT 4.0 and DS/2. The ports and connectors all have good labels. However, a quick-start guide is not provided.		Quick-start guides for monitor and computer. All system ports/connectors clearly labeled. QA Plus WIN/WIN diagnostic utility is useful in ensuring proper functioning of system components and in viewing hardware/software configurations.	
★★	40.00	★★★★	60.00	★★★	60.00	★★	40.00	★★	40.00
The system ships a 3G hard disk drive but only 256K of cache memory and 1M of SGRAM. A built-in sound card is optional. Additional features include a 12X CD-RDM drive, 2 USB ports and a 64-bit integrated graphics engine. Numerous utility programs are bundled.		System ships with a 64-bit video/graphics engine with 4M of memory and a good complement of software titles. Also included are a 3.5G hard drive, 512K of cache memory, a 16X CD-RDM drive and both SIMM and DIMM memory sockets.		Our unit had an average-size hard drive (2.1G), but it was configured with 512K of cache, a 10/100 network interface and a high-end video card with 4M of memory. Comes with a 16X CD-RDM drive, subwoofer and microphone. Nice windows shutdown feature.		Systems ships with 256K of cache memory, 3G of hard drive space, a 12X CD-RDM drive, speakers and a 64-bit graphics engine with 2M of video memory.		The most peculiar thing about this system is the lack of audio support. Provided with the system, however, are a 2.5G hard drive, an integrated 64-bit graphics engine with 4M of memory, 512K of cache memory, infrared support and an 8X CD-RDM drive.	
★★★	45.00	★★★★	60.00	★★★★	60.00	★★★	45.00	★★★	45.00
Five free expansion slots. Two external and 1 internal drive bays available after factory configuration. Ships with 256K of cache memory and supports up to 256M of SDRAM DIMM memory. But the 1M of SGRAM video memory is limited to 2M.		Five free expansion slots available after factory configuration. Two external and 1 internal drive bays open. System’s video memory is expandable to 8M. Maximum system RAM and cache memory amount to 256M and 512K respectively.		Although it is lacking in available expansion slots with only three, the system has 512K of cache capacity and can support up to 8M of video memory. The system’s maximum RAM capacity also is 256M.		RAM is expandable to 128M. A user can upgrade cache to 512K. Two open internal drive bays and 4 expansion slots available after factory configuration. But 1 PCI and 1 ISA slot are unusable due to an obstruction. Supports up to 4M of video memory.		Four expansion slots available after factory configuration. Support for up to 192M of RAM. However, drive bay availability is lacking, with only 1 internal and 1 external open. System can support up to 8M of VRAM on the card (only 2M on board the chip).	
★★★★★	75.00	★★★	45.00	★★★	45.00	★★★	45.00	★★★★★	75.00
Windows 3.xx/95/NT, DDSxx, DS/2, Unix.		Windows 3.xx/95/NT, DDSxx.		Windows 3.xx/95/NT, DDSxx.		Windows 3.xx/95/NT, DDSxx.		Windows 3.xx/95/NT, DS/2, DDSxx, Unix.	
★★★★★	75.00	★★★	45.00	★	15.00	★★★	45.00	★★★★	60.00
Presents very technical information in an easy-to-read format. In addition, there’s a separate, comprehensive manual to trouble-shooting.		Excellent 12-page quick-start section with color photos, but owner’s manual was not professional-looking. Brief trouble-shooting section.		Manual is for system board only and offers mainly configuration info. All manuals except that for Windows 95 come in a hard-cover binder.		Good instructions on Windows 95. The trouble-shooting section is not very large, but it offers 14 problem scenarios. High-quality illustrations.		Lots of well-written documentation that is easy to read and not too technical. Excellent quick-start guides to help you set up the system.	
★★★★★	75.00	★★★★	60.00	★★★	45.00	★★★	45.00	★★	30.00
No hold time. Every call was well-handled by friendly, well-informed technicians. They even answered our follow-up questions before we asked them. Great service.		Hold times varied from 1 to 7 minutes. Technicians were helpful, but they lacked the extra effort to earn a score of excellent.		Hold times averaged about 3 minutes. Technicians answered our questions thoroughly but did not offer additional information unless prompted.		Little to no hold time. Although we found the technical staff knowledgeable, they, at times, left out important information in their solutions.		No hold time. Representatives manning their federal line are excellent but very hard to reach. We had to leave a message several times, one of which was never returned.	
★★★★★	100.00	★★★★	80.00	★★★★	80.00	★★	40.00	★★★★★	100.00
3 years 1 year 30 days Yes Yes Internet		3 years 1 year 30 days Yes Yes Internet		3 years (Does not include shipping.) 1 year 30 days Yes Yes In-house 7 a.m. to 8 p.m., M-F and 9 a.m. to 3 p.m., Sat. (CST)		3 years 1 year No Yes None		3 years 1 year Per reseller Yes Yes AOL, CompuServe, in-house BBS, Internet, Prodigy 24 hours, 7 days	
24 hours, 7 days		8 a.m. to 6 p.m., M-F (EST)				8:30 a.m. to 6 p.m., M-F (EST)		24 hours, 7 days	
\$2,704	118.18	\$2,149	148.70	\$2,225	143.62	\$1,826	175.00	\$2,625	121.73
Digital GS-35F-4663G (800) 700-5899		Dunn Computer GS-35F-4085D (800) 296-DUNN		EPS Technologies GS-35F-4095D (800) 551-1727		Global InSync GS-35F-3194D (703) 913-2400		GE Capital IT Solutions Federal Systems GS-35F-3013D (800) 374-9434	
7.98		7.27		7.00		6.50		7.67	
Excellent vendor support makes up for what the Venturis lacks in terms of performance and features. Still a good buy.		There are very few drawbacks to this system. It provides good performance at an affordable price. A better score in setup would have helped.		Good performance for the price. However, to be a contender, this system needs improvements in documentation and technical support.		This system was the slowest of the field, with a 148 on the SYSmark/32. In addition, scores of satisfactory for features and support policies require improvement.		A fourth-place finish in a field of 20 is highly competitive. Improvements in features and technical support would have pushed this system higher.	

200 MHz PCs Compared



Products receive ratings from excellent to unacceptable in certain categories. Scores are derived by multiplying the weighting of each criterion by its rating, where:

- ***** = Excellent = 1.0 Outstanding in all areas
- **** = Very Good = 0.8 Meets all essential criteria and offers significant advantages
- *** = Good = 0.6 Meets essential criteria and includes some special features
- ** = Satisfactory = 0.4 Meets essential criteria
- * = Poor = 0.2 Falls short in essential areas
- = Unacceptable = 0.0 Fails to meet minimum standards or lacks a feature

Scores are summed, divided by 100 and rounded down to two decimal places to yield the final score out of a maximum score of 10.0 (plus bonus). Products rated within 0.2 points of one another differ little.

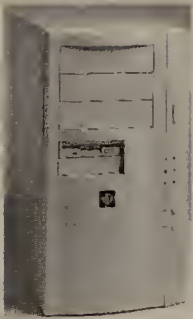
Configuration Requested

- 32M of RAM
- 2G to 3G hard drive
- 17-inch monitor
- Windows 95

Processor Picks

- ♦ Pentium chip
- ± K6 chip

		TD-25 ♦		Inteva K6 200 Multimedia+		Magitronic G-K6200-FMX4+		Millennia MME P200 ♦	
	Company	Intergraph Federal Systems (888) 671-5339 www.intergraph.com/federal		Inteva Microsystems Inc. (888) 4 INTEVA www.inteva.com		Magitronic Technology Inc. (800) 872-0463 www.magitronic.com		Micron Electronics Inc. (888) 665-5339 www.micronpc.com	
	WEIGHTING								
	SYSmark/32	175	182	207	175.00	180	152.17	193	163.16
	System Design	75	★★★	★★★	45.00	★★★	45.00	★★★★	60.00
		A locking front panel provides good security for the external drive bays. Two USB ports and DMI support also were incorporated. We also liked the integrated multimedia features that were placed on the keyboard, which included speakers, microphone, mute button and a line-out port for the sub-woofer. However, we didn't notice any particularly modular components.		The system is not particularly modular, and memory is obstructed by wiring and ribbon cables. However, the floppy drive slides out of the chassis fairly easily. The system's serial, parallel and USB ports are wired internally to the motherboard. The USB wire connections somewhat obstruct the adjacent ISA slot.		Excellent modularity with quick-release slide-out hard drive and CD-RDM drive. However, the memory and expansion slots are obstructed slightly by ribbon cables and an empty drive bay housing. There are 5 internal and 5 external drive bays.		A sliding side panel provides quick access to internal components. There are plenty of expansion slots and drive bays for peripherals. The system also comes equipped with a built-in sound card that provides several audio ports and a MIDI connector and also includes 2 USB ports.	
	Setup	75	★★★★	★★	30.00	*	15.00	★★★	45.00
		No quick-start guide was bundled with our unit. We particularly liked the incorporation of Intergraph's InterSite utility for creating backup disks, rescue disks and emergency repair disks at start-up. On-line documentation is also provided.		No quick-start guide; easy-to-read labels make cable connections a snap. However, we were provided only with basic Windows 95 software and documentation. There are no special system diagnostic or configuration utilities provided.		The lack of quick-start guide and clearly labeled ports made setup more difficult. Good selection of software programs on CD-RDM/diskettes was provided. However, there was no special utilities to help simplify setup and trouble-shooting.		No quick-start guide, but cable connections are labeled clearly. Multimedia and Zip drive software utilities are provided on CD-ROM and diskettes. However, there are no special system or networking utilities included.	
	Features	100	★★★★	★★★	60.00	★★★★	80.00	★★★★	80.00
		During shutdown, system automatically kills power. Supports 512K of cache memory and 4M of VRAM. Software bundle includes on-line services, Microsoft Plus apps and video utility. Also included is a 3.5G hard drive, a 12X CD-RDM drive, 32-bit audio and a 64-bit graphics card.		Includes a pre-installed 33.6 fax/data modem and software programs on CD-RDMs. The system also includes a 2.1G hard drive, a 64-bit graphics engine with 4M of memory and a 16X CD-RDM drive. No pre-installed networking capability.		An extensive software bundle is included. It also ships with 512K of cache memory, 4M of VRAM and a 64-bit video graphics engine. Desktop speakers, headphones and a 33.6 fax/data modem also are included. Rounding out the design is a 2.1G hard drive and a 12X CD-ROM drive.		Our system shipped with a 3.1G hard drive, a 33.6 data/fax modem, 512K of cache memory, a 16X CD-ROM drive and a 64-bit graphics engine. It was the only system to ship with a Zip drive, and it uses a new Microsoft mouse. The system ships with MS Office 97 and Zip drive utilities.	
	Expandability	75	★★★★	★★★★	60.00	★★★★	60.00	★★★★	60.00
		Five free expansion slots open. Two internal and 1 external drive bays free. Memory expansion is limited, with a maximum capacity of only 64M. Although up to 8M of VRAM is supported, the expansion socket was used.		Three external and 2 internal bays open after factory configuration. Four expansion slots also were available. System memory can be expanded to 256M via 2 DIMM sockets or to 128M if you use only SIMM sockets. Maximum video memory is 8M.		The system's 2 open PCI expansion slots are taken up by the serial port and cannot be used. Up to 512M of DRAM can be loaded in this system, along with up to 8M of VRAM. Four internal and 3 external bays open after factory configuration.		This system provides 4 open expansion slots, 2 available external drive bays and support for up to 256M of DIMM memory. It also supports up to 8M of VRAM. But internal drive bay availability is limited, with only 1 bay open.	
	Compatibility	75	★★★	★★★★★	75.00	★★★★	60.00	★★★	45.00
		Windows 3.xx/95/NT, DDSxx.		Windows 3.xx/95/NT, OS/2, DDSxx, Unix.		Windows 3.xx/95/NT, OS/2, DDSxx.		Windows 3.xx/95/NT, DDSxx.	
	Documentation	75	★★★	★★★	45.00	*	15.00	★★★	45.00
		Intergraph did not provide much in the way of documentation. However, the system guide outlines the setup and configuration instructions very well.		The user's manual offers no information for administrators. The trouble-shooting section is weak. The graphics are highly detailed.		The user's guide is for the motherboard only and does not offer information on the computer. It is also a bit technical for an entry-level user.		Documentation lacked technical detail, but graphics were very good. The trouble-shooting chapter is very helpful.	
	Technical Support	75	★★★★	★★	30.00	*	15.00	★★★★★	75.00
		Hold times averaged 8 minutes. The technical staff was very helpful and willing to go beyond the call of duty. First-time users, however, may require more proactive assistance.		No hold time. We were forced to leave messages several times for call-back service. Sometimes technicians were informative, other times not.		Although hold times were minimal, technical support was poor. The technicians were not very helpful and, at times, were incapable of walking us through simple procedures.		A government-only support line continues to provide immediate service with no hold time. In addition, technicians were very patient and informative. They offered useful tips.	
	Support Policies	100	★★★★	★★	40.00	★★★	60.00	★★★★★	100.00
	Warranty	3 years		1 year		2 years		3 years	
	On-Site Service	1 year		Yes, fee-based		1 year; fee-based		1 year	
	Money-Back Guarantee	30 days		Varies by reseller		None		30 days	
	Fax-Back Support	Yes		Yes		No		Yes	
	Toll-Free Line	Yes		Yes		Yes		Yes	
	Other Support	In-house BBS, Internet		Internet		Internet		CompuServe, in-house BBS, Internet	
	Support Hours	7 a.m. to 7 p.m., M-F (EST)		9 a.m. to 6 p.m., M-F (EST)		24 hours, 7 days (limit of 1 year free)		24 hours, 7 days	
	GSA Price (as of May 30)	175	\$2,781	114.90	\$2,249 (list)	142.09	\$1,892	168.86	\$2,478
	Reseller/Prime	Intergraph		Riordan & Ross Distribution Inc.		Federal Services Inc.		Micron	
	GSA No./Contract	GS-35F-4155D		Expected soon		GS-35F-3126D		Pending approval	
	Phone	(888) 671-5339		(800) 727-6282		(800) 872-0463		(888) 665-5339	
	Final Score	1000	7.09	7.02	6.71	8.02			
	Remarks	Solid and consistent scores across the board were hampered by a higher price. Still, the TD-25 is a good deal overall.		This system blew the competition away in benchmark performance. Scores of satisfactory, however, in technical support, support policies and setup were not good enough to improve this system's standing.		Poor scores in three categories — setup, documentation and technical support — dragged down the overall score.		Micron delivers a quality package with the Millennia. Included is a well-designed and speedy system that is backed by excellent vendor support.	



Nucleus Pentium MMX ♦

Micronics Computers Inc.
(800) 577-0977
www.micronics.com

185 156.40
★★★ 45.00

The system's motherboard pops out easily, and there are no obstructions to working inside the cabinet. Once you remove the front bezel, the CO-ROM drive also slides directly out of the chassis. Infrared support is provided on the motherboard, but a port was not included. The system also provides USB ports.

★★ 30.00

No quick-start guide, and the system's ports are not labeled clearly. A good complement of Matrox Graphics software applications/utilities was provided on CO-ROM. A Windows 95 CD also was bundled with this system.

★★ 40.00

The system includes a solid yet average feature set. Our test unit shipped with 4M of VRAM and 512K of cache memory. Rounding out the list of features was a 2.5G hard drive, a 12X CD-ROM drive, desktop speakers and a 64-bit graphics engine.

★★★★ 60.00

Four slots available after factory configuration. Three external drive bays available but no open internal bays. System memory is expandable to 256M of ECC EDO/FPM. Video memory also can be upgraded to 8M.

★★★★★ 75.00

Windows 3.xx/95/NT, OS/2, Unix, OOSxx.

★★★ 45.00

Manual only covers the system board but gives good setup and configuration instructions.

★★★★ 60.00

Hold times were minimal. The technical staff was knowledgeable and knew their products very well.

★★★★ 80.00

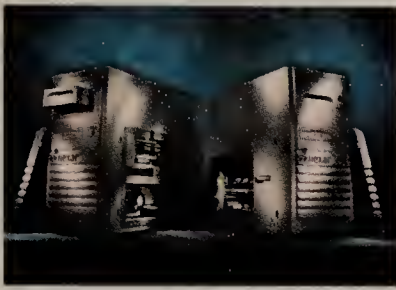
2 years (NIH customers)*
2 years*
No
Yes
Yes
In-house BBS, Internet

24 hours, 7 days (EOS Support)

\$3,199 99.89
EOS
NIH Electronic Computer Store
(800) 241-2143

6.91

This system offers good benchmark-performance results and very good scores for technical support, support policies and expandability.



Nexar II ♦

Nexar Technologies Inc.
(888) NEXAR-PC
www.nexarpc.com

169 142.87
★★★★ 60.00

Locking side-access panels and a key lock for the hard drive and keyboard provide this system with exceptional security features. System components are also highly accessible. In addition, 2 USB ports are provided. However, the system is not particularly modular and is not network-ready.

★★★★ 45.00

We found the quick-start section of the user manual to be very helpful. A very useful Windows 95 interactive tutorial program is also provided on CO-ROM. However, there are few other software utilities included.

★★ 40.00

Our system shipped with a 3.1G hard drive, 512K of cache memory and a 16X CD-ROM drive. However, the 64-bit graphics engine only came equipped with 2M of VRAM. We were surprised by the lack of a sound card. There were no extra software titles provided beyond Windows 95.

★★★★ 45.00

Six expansion slots available after factory configuration. However, only 1 external and 1 internal bay open. Video memory can be expanded to only 4M. SIMM and OIMM sockets used for a total memory capacity of 128M and 256M respectively.

★★★★★ 75.00

Windows 3.xx/95/ NT, OS/2, Unix, OOSxx.

★★★ 30.00

Quick-start section is well done, but overall organization needs work. Fonts are hard to read. Minimal trouble-shooting section.

★★ 30.00

Hold times vary. On 1 call we had to leave a message, which was returned 4 hours later. The info given by techs was sufficient, but overall support was average.

★★★★ 60.00

3 years (parts); 1 year (labor)
1 year
No
No
Yes
Internet

8 a.m. to 8 p.m., M-F (EST)

\$2,249 141.83
GTSI
GS-35F-41200
(800) 999-4874

6.70

A satisfactory feature list, documentation and technical support along with mediocre benchmark results stood in the way of what would have been a solid buy.



NYMA Pentium MMX ♦

NYMA Inc.
(800) 552-6962
www.nyma.com

188 158.94
★★★ 45.00

The system's motherboard is attached to an easily removable side chassis panel. However, the unit's hard drive is difficult to remove because 2 of the 4 screws holding it in place are difficult to access. The CPU for this system comes equipped with a fan.

★★ 30.00

Lack of a quick-start guide made setup slightly difficult with respect to system cables. There are no special setup utilities or tutorials included with this system. However, we liked the bundle of Matrox graphics utilities that were provided on CO-ROM.

★★ 40.00

16X CO-ROM drive, a 2.5G hard drive, 512K of cache memory and a 64-bit graphics engine with 4M of VRAM included. Extra multimedia features include a 16-bit audio card and desktop speakers. Also bundled are a Matrox Power Quest graphics card utility and some Microsoft software.

★★★★ 60.00

Six free expansion slots provide plenty of room for expandability. In addition, the system's video memory can be expanded to 8M. Although there are 3 external drive bays open, there are no internal drive bays available after factory configuration.

★★★★ 45.00

Windows 3.xx/95/NT, OOSxx.

★★★★ 45.00

The system manual only addresses the system board. Although there is no trouble-shooting section, a well-done glossary is included.

★★ 30.00

Hold times varied from none to leaving a message. The technical expertise of the technicians varied, with some having ready answers and others requiring assistance.

★★ 40.00

1 year
1 year (Washington, O.C., area only)
30 days
No
Yes
Internet (under construction as of May 14)
8 a.m. to 6 p.m., M-F (EST)

\$2,409 132.65
NYMA
GS-35F-4449G
(800) 552-NYMA

6.27

Four scores of satisfactory are difficult to overcome. However, this system offers very good expandability and packs a powerful performance punch.



Amera 200/A+

Pantex Computer Inc.
(800) 756-7847
www.pantex.com

190 160.63
★★ 30.00

Although this system has a small footprint, there is not much room for getting to the memory slots. In addition, only 1 internal drive bay is provided. The motherboard is modular and can be removed easily. The motherboard must be removed to access 1 of the hard drive's mounting screws.

★★ 30.00

In addition to no quick-start guide, there aren't many bells and whistles as far as setup utilities are concerned. One problem we noticed was that all the system's LEO wires were disconnected from the motherboard upon arrival, as was the reset button.

★★ 40.00

Our unit shipped with a 2.5G hard drive, 512K of cache memory, a 12X CO-ROM drive, desktop speakers with surround sound and a built-in amplifier, and a 64-bit graphics engine with 4M of VRAM. A fax/data modem also was included, as were Lotus SmartSuite and America Online.

★★★★ 45.00

256M of memory capacity is supported via OIMM and SIMM sockets. Four expansion slots available after factory configuration. But only 2 external drive bays are open; no internal drive bays available. Video memory is limited to 4M.

★★★★ 45.00

Windows 3.xx/95/NT, OOSxx.

★★ 30.00

Plenty of documents covering system components and software; the 1 thing missing was a single manual guiding the user through the PC.

★★ 30.00

Hold times averaged from 2 to 5 minutes. Technicians were fairly knowledgeable but somewhat inefficient. We left one message that was never returned.

★★ 40.00

1 year
1 year
30 days
No
Yes
Internet

9 a.m. to 6 p.m., M-F (CST)

\$2,205 (list) 144.92
Pantex
Pending
(800) 756-7847

5.96

The Amera 200/A came close to scoring satisfactory across the board. Fortunately, it managed to post a good in expandability and compatibility and also turned in very competitive benchmark results.



SMAC Data System 200MMX ♦

SMAC Data Systems Inc.
(800) 344-7622
www.smacdata.com

181 153.02
★★★★ 45.00

Built-in 10/100 LAN card and support for PC Cards. Modular design with quick-release tabs on the CO-ROM and floppy drive bays. However, the front bezel must be removed before you can get either of these drives out of the system. The hard drive, by contrast, was fastened to the chassis with screws, and properly aligning the drive was a bit tricky.

★★★★ 45.00

A getting-started guide is provided; only partial labeling for port/cable connections. Network card and IPX/SPX and NetBEUI network protocols pre-installed. Advanced video and sound card utilities and drivers also are provided.

★★★★ 80.00

The SMAC system shipped with a 3.1G hard drive, 512K of cache memory, a 16X CD-ROM drive, desktop speakers, a 128-bit graphics engine with 4M of VRAM, a 33.6 data/fax modem and a built-in LAN card.

★★★★ 45.00

This system can handle up to 256M of memory but only provides 2 available expansion slots for additional cards. Free drive bays are a little bit better, with 2 external and 3 internal bays available for use.

★★★★★ 75.00

Windows 3.xx/95/NT, OS/2, Unix, OOSxx.

★★ 30.00

Only thing like a user's manual was a guide to the system board. Other documents explained components. Very brief trouble-shooting section.

★★★ 45.00

Little to no hold time. Technicians were eager to help but did not answer our questions fully. More than 1 technician was required to answer relatively simple questions.

★★★★ 80.00

3 years
1 year
15 days
No
Yes
Internet

24 hours, 7 days

\$1,892 168.90
SMAC Data Systems
GS-35F-42510
(800) 344-7622

7.67

This is one of the most affordable systems in the review. With a few minor improvements in documentation and technical support, this system will be a contender for the top seat.

Chart continues on Page 24

*1 year for non-NIH contract customers



Sample GSA Configurations

Professional Systems

Professional P5-133 System

- Intel® 133MHz Pentium® Processor
- 16MB EDO DRAM
- 256K Pipelined Burst Cache
- Vivitron®500 .26dp Monitor (13.9" viewable)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 1GB 11ms EIDE Hard Drive
- 12X CD-ROM & 3.5" Diskette Drives
- Mini Tower Case
- 104* Keyboard & MS® IntelliMouse™
- Microsoft® Windows 95
- MS Office 97, Small Business Edition† plus Bookshelf 96
- Gateway Gold™ Service and Support for Desktop PCs**

\$1564

Professional P5-166 System

- Intel 166MHz Pentium Processor
- 16MB EDO DRAM
- 256K Pipelined Burst Cache
- Vivitron700 .28dp Monitor (15.9" viewable)
- 2MB SGRAM, 64-Bit PCI Graphics
- 2GB 11ms EIDE Hard Drive
- 12X CD-ROM & 3.5" Diskette Drives
- Mini Tower Case
- 104* Keyboard & MS IntelliMouse
- MS Windows 95
- MS Office 97, Small Business Edition† plus Bookshelf 96
- Gateway Gold Service and Support for Desktop PCs**

\$1907

Professional P5-200 System

- Intel 200MHz Pentium™ Processor with MMX™ Technology
- 32MB SDRAM
- 256K Cache
- Vivitron700 .28dp Monitor (15.9" viewable)
- 2MB SGRAM, 64-Bit PCI Graphics
- 3GB 11ms EIDE Hard Drive
- 12X CD-ROM & 3.5" Diskette Drives
- Mini Tower Case
- 104* Keyboard & MS IntelliMouse
- MS Windows 95
- MS Office 97, Small Business Edition† plus Bookshelf 96
- Gateway Gold Service and Support for Desktop PCs**

\$2386

The Verdict Is In.

Government purchasers on the GSA Schedule have rendered their decision: Gateway 2000 is the number-one direct marketer of PCs on the schedule for the second straight year.*

Gateway 2000 Major Accounts, Inc. presents a compelling case for GATEWAY™ PCs.

Exhibit A: Quality. Brand name components. Reliable vendors. Stable platforms. Rigorous testing. Gateway's desktop and portable manufacturing divisions in North Sioux City, S.D., are ISO 9002 certified.

Exhibit B: Custom configuration. Gateway Major Accounts customers decide what goes into their Gateway PCs. We won't start building your PCs until you tell us what you want in them.

Exhibit C: Value of Ownership. The great benefits of owning Gateway PCs combined with low costs over the life cycle of the PC.

Exhibit D: Expert sales assistance. Gateway has formed a wholly owned subsidiary, Gateway 2000 Major Accounts, Inc. to focus exclusively on the PC needs of *Fortune* 1000, government and education customers.

Call the Gateway Federal Government sales team today and judge the overwhelming evidence for yourself. We're confident you'll arrive at the same verdict as buyers on the GSA schedule: Gateway is number one.



†MS Office 97,
Small Business Edition
MS Word 97, MS Excel 97,
MS Publisher 97, MS
Outlook™ 97, MS Automap®
Streets, plus Bookshelf 96

*GSA Schedule sales for fiscal
years 1995 and 1996 according to
International Data Corporation.



8 0 0 - 8 4 6 - 2 3 0 7

www.gateway.com/majoract/majoract.htm

Gateway 2000 Major Accounts, Inc.
610 Gateway Drive, P.O. Box 2000, North Sioux City, SD 57049-2000
Phone 605-232-2000 • Fax 605-232-2716

GSA Schedule #GS-35F-4565G

Gateway accepts government IMPAC credit cards.
Ask about custom configurations.
Prices shown are Gateway 2000's prices for
sample configurations in accordance with the
Price Reduction Clause. Prices shown include
shipping FOB U.S. destination.

**Call or write for a free copy of our limited warranty.



Sample GSA Configurations Professional Systems

Professional G6-200 System

- Intel 200MHz Pentium® Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- Vivitron700 .26dp Monitor (15.9" viewable)
- 4MB SGRAM, 64-Bit PCI Graphics
- 2GB SCSI Hard Drive with Controller
- 12X SCSI CD-ROM & 3.5" Diskette Drives
- 10/100 PCI Ethernet Adapter
- 12-Bay Tower Case
- 104+ Keyboard & MS IntelliMouse
- MS Windows NT™ 4.0
- MS Office 97, Small Business Edition†
plus Bookshelf 96
- Gateway Gold Service and Support for Desktop PCs**

\$2864

Gateway Solo™ Portable PCs

Solo 2100SE

- 11.3" SVGA DSTN Color Display
- Intel 120MHz Pentium Processor
- 16MB EDO DRAM expandable to 72MB
- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- 1GB Hard Drive
- Modular 3.5" Diskette Drive
- Modular 6X min/11X max CD-ROM Drive
- 16-Bit Sound w/Stereo Speakers
- Lithium Ion Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- Microsoft® Windows 95 & MS Office 97,
Small Business Edition† plus Bookshelf 96
- Gateway Gold™ Service and Support for Portable PCs**

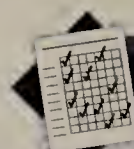
\$2153

Solo 2200SE

- 12.1" SVGA Active Matrix Color Display
- Intel 150MHz Pentium Processor
with MMX Technology
- 16MB EDO DRAM expandable to 80MB
- 256K Pipelined Burst Cache
- 2MB EDO Video RAM
- 1.3GB Hard Drive
- Modular 3.5" Diskette Drive
- Modular 6X min/11X max CD-ROM Drive
- 16-Bit Sound w/Stereo Speakers
- Lithium Ion Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95 & MS Office 97,
Small Business Edition† plus Bookshelf 96
- Gateway Gold Service and Support for Portable PCs**

\$3224

200 MHz PCs Compared



HOW WE TESTED

200 MHz PCs

We evaluated these 200 MHz desktop computers using tests designed to show their usability, performance and feature differences. The benchmark we used to evaluate performance is SYSmark/32 for Windows 95 and Windows NT from Business Applications Performance Corp., an industry consortium. For more details about how we tested these PCs, visit our Web site at www.fcw.com/pubs/gbb.

Performance

We scored speed mathematically; the fastest system received the maximum number of points possible (175). All other units received a percentage of the maximum points based on their slower performance.

System Design

Our system design criteria included how easy it was to remove covers, disk drives and motherboards. We also evaluated accessibility to system memory and expansion slots. Systems with built-in peripherals, network interface cards, fax/data modems and sound cards got extra points. Lastly, we looked for useful LEDs, enhanced keyboards and special ports. We used word scores that were translated into percentages of the 75 points assigned to this category.

Setup/Ease of Use

Issues that determined this score included whether a product had bundled or pre-installed applications, a disk-maker icon, clearly labeled computer ports and on-line system documentation. We used word scores that were translated into percentages of the 75 points assigned to this category.

Features

Key areas examined in the features section included storage/memory, multimedia, video, networking and special peripherals. We also gave extra points for fast CD-ROM drives, the latest mouse technology, speakers, microphones, Zip drives and PC Card sockets. We used word scores that were translated into percentages of the 100 points assigned to this category.

Expandability

In the expandability category, we scored a system's maximum capacity based on the number of free internal and external drive bays,

available expansion slots after factory configuration, maximum RAM and cache, and the highest upgrade possible for video memory. We used word scores that were translated into percentages of the 75 points assigned to this category.

Compatibility

We scored compatibility on two fronts. First, we ran our benchmark suite, and if we had problems with drivers, we lowered the score one point. We then added the number of operating systems certified by each company on each computer. Again, we used word scores that were translated into percentages of the 75 points assigned to this category.

Documentation

At a minimum, documentation had to tell us how to set up and use the system and had to include accurate diagrams to illustrate the text. Comprehensive, well-organized and well-written manuals received higher scores. Again we used word scores that were translated into percentages of the 75 points assigned to this category.

Technical Support

We based technical support scores on the quality of service we received during multiple anonymous support calls. Busy signals, voice mail-only service and excessive resolution times all resulted in lower scores. We assigned word scores that were translated into percentages of the 75 points assigned to this category.

Support Policies

A one-year warranty covering parts, labor and unlimited technical support from the vendor earned a satisfactory score. We awarded bonus points for unconditional money-back guarantees, on-site service included in the purchase price, extended support hours, bulletin board support (such as CompuServe) and a toll-free number. We subtracted points for no technical support, a limited support period and dealer-only support. We then assigned word scores that were translated into percentages of the 100 points assigned to this category.

Price

Price was scored mathematically. The lowest-priced unit received the total possible points (175). All other systems received a percentage of the total points.

Equium 5200D ♦

Company Toshiba America Information Systems Inc.
(800) 477-1616
www.governmentales.toshiba.com

SYSmark/32 175 164 138.65
System Design 75 ★★★★★ 75.00

Setup 75 ★★★★★ 75.00

Features 100 ★★★ 60.00

Expandability 75 ★★★ 45.00

Compatibility 75 ★★★ 45.00

Documentation 75 ★★ 30.00

Technical Support 75 ★★★★★ 75.00

Support Policies 100 ★★★★★ 80.00

Warranty 3 years
On-Site Service 1 year
Money-Back Guarantee None
Fax-Back Support Yes
Toll-Free Line Yes
Other Support AOL, CompuServe, in-house BBS, Internet, Microsoft Network, Prodigy
Support Hours 7 days, 6 a.m. to 6 p.m., (PST)
GSA Price (as of May 30) 175 \$2,507 127.46
Reseller/Prime Toshiba
GSA No./Contract GS-35F-33040
Phone (800) 477-1616

Final Score 1000 7.51

Remarks Performance is good, given the system's limited cache and video memory. Documentation, however, will need to be improved before this system can compete with the top five.

200 MHz K6 System+

V-Squared Inc.
(888) 377-1377
www.vsqared.com

SYSmark/32 192 162.32
System Design ★★★★★ 45.00

Setup ★★ 30.00

Features ★★★ 60.00

Expandability ★★★ 45.00

Compatibility ★★★★★ 75.00

Documentation ★★ 30.00

Technical Support ★★ 30.00

Support Policies ★★ 40.00

Warranty 1 year (does not include shipping)
On-Site Service 1 year; fee-based
Money-Back Guarantee None
Fax-Back Support No
Toll-Free Line No
Other Support Internet
Support Hours 9 a.m. to 5:30 p.m., M-F (EST)
GSA Price (as of May 30) 175 \$3,190 100.17
Reseller/Prime PC-Expanders Inc.
GSA No./Contract GS-35F-4556G
Phone (703) 448-1400

Final Score 1000 6.17

Remarks This is a very fast system, and it offers excellent compatibility. Unfortunately, it was hampered by scores of satisfactory in several very important categories.

Products receive ratings from excellent to unacceptable in certain categories. Scores are derived by multiplying the weighting of each criterion by its rating, where:

- ★★★★ = Excellent = 1.0 Outstanding in all areas
- ★★★★ = Very Good = 0.8 Meets all essential criteria and offers significant advantages
- ★★★ = Good = 0.6 Meets essential criteria and includes some special features
- ★★ = Satisfactory = 0.4 Meets essential criteria
- ★ = Poor = 0.2 Falls short in essential areas
- = Unacceptable = 0.0 Fails to meet minimum standards or lacks a feature

Scores are summed, divided by 100 and rounded down to two decimal places to yield the final score out of a maximum score of 10.0 (plus bonus). Products rated within 0.2 points of one another differ little.

Configuration Requested

- 32M of RAM
- 2G to 3G hard drive
- 17-inch monitor
- Windows 95

Processor Picks

- ♦ Pentium chip
- + K6 chip

Helmet Not Included

HP Vectra Computers Blow Past The Competition At Breakneck Speed

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ROM drive and numerous diagnostic software tools wrap up the Digital's feature set.

We gave the Venturis a score of good for expandability. Available after factory configuration were five expansion slots for adding cards and two external and one internal drive bays. The system's memory can be upgraded to 256M of SDRAM and up to 4M of video memory on the graphics accelerator.

Digital's score on the SYSmark/32 benchmark was 177. As with many of the systems, the Digital's best performance was on the desktop graphics portion of the benchmark, where it posted a 296. Although this was 30 points ahead of the Dell PC, the Venturis still lagged more than 75 points behind the Micron, which won this category.

The Venturis FX-2 5200M is available to government buyers on the GSA schedule for \$2,704. Although its performance may be somewhat lacking compared with other systems in the review, the Venturis is a solid buy backed by excellent vendor support. (At press time, Digital announced plans to produce a K6 version of the Venturis as well.)

PC 350

It's been almost a year since we last took a look at the PC 350 from IBM in a major desktop comparison. With this year's model, the company continues to offer a solid contender that posts competitive

results. Its overall score was 7.67, and it ties for fourth place.

The PC 350 was one of only three systems turning in a score of excellent for system design. It has a highly modular chassis, with the memory slots located on a vertical riser card, and it requires the removal of a single screw to extract the hard drive. Two things we particularly liked were the fact that users can upgrade the processor's cache memory, and the system has a sliding front panel that secures the external drive bays from unauthorized access. But what was really noticeable was the sturdiness of the chassis compared with many of the other systems. This is a well-built machine.

We were very surprised to find not just one but two quick-start guides from IBM — one for the system and another for the monitor. In addition, all the system's ports and connectors were labeled clearly.

IBM also included DiagSoft Inc.'s QA Plus WIN/WIN system diagnostic utility, which allows users to view various hardware and software configurations and also tests system components to ensure they are working properly. In the end, the PC 350 earned a score of very good for setup.

We were surprised by the lack of audio support on the PC 350. Still, the system's satisfactory feature list includes a 2.5G hard drive, 512K of cache memory, two USB ports, infrared support, an 8X CD-ROM drive and a 64-bit graphics engine with 4M of memory. IBM also includes several software apps, such as its anti-virus utility, Intel's ProShare data collaboration tool and Lotus Development Corp.'s SmartSuite. Unfortunately, we were unable to award any points for SmartSuite because

it was not included with our evaluation unit.

Another nice feature that was missing in action was IBM's "wake-on-LAN" software, which allows system administrators to remotely update system files and perform other administrative tasks even if the computer is turned off. This feature comes standard, according to IBM's documentation, but it was not included with our evaluation unit.

Four free expansion slots and support for up to 192M of EDO RAM helped earned the IBM system a score of good for expandability. Drive bay expandability could have been better, however, with only one internal and one external bay available after factor configuration. Video memory expandability is also robust, with up to 8M of VRAM supported.

The PC 350's benchmark performance was highly competitive, posting a final score of 190 on the SYSmark/32. Scores on the benchmark applications were solid across the board and helped the IBM system come within three points of the leading Micron machine in performance.

IBM's \$2,625 price places the PC 350 above average on the price/performance spectrum (see chart, Page 34). It could have easily broken into the top five systems with improvements in technical support and features, both of which received scores of satisfactory. Regardless, this system is still a very good buy.

SMAC Data System 200MMX

The machine from SMAC Data Systems tied for fourth place with the IBM system. SMAC's final score of 7.67, See **DESKTOP**, Page 28



NOTES FROM THE TEST CENTER

Gateway's P5-200 Proves Solid Competitor

► ANDREAS UITERWIJK

Gateway 2000 Inc.'s P5-200 arrived too late for us to include it in our main comparison, but we were able to take a quick look at this new system from the No. 1 vendor on the GSA schedule.

The Gateway P5-200 is a stand-alone minitower with a 200 MHz Intel Pentium MMX processor at its heart. It packs a lot of features for the dollar, but performance was hampered by a faulty video card.

The system comes loaded to the hilt with hardware and software. It features 32M of RAM, a Western Digital Caviar 3.1G EIDE hard drive, a Toshiba America Information Systems Inc. 12X IDE CD-ROM drive, dual Universal Serial Bus (USB) ports and an ATI RAGE II+ PCI video card with 4M of memory. In addition, it offers 256K of pipelined burst SRAM cache, a Microsoft Corp. IntelliPoint mouse and a 17-inch monitor. This hardware feature set earns Gateway a very good score.

The Gateway system comes pre-loaded with three software packages from

Microsoft: Windows 95, Office 97 and Small Business Financial Manager 97. Also included with the system but not pre-loaded are Microsoft's Automap Streets Plus Addition and Encarta 97. While the system comes with a lot of bundled software, it does not come with a tutorial or on-line help system for novice users, nor does it bundle a diagnostic program.

Overall, we rated the software feature set good.

The P5-200's case has a sleek design and can be used in either a tower or desktop configuration. To switch the system to a desktop configuration, you need to remove the front bezel, pull out a few screws and rotate the floppy and CD-ROM drive holders 90 degrees. Or, if you don't want the hassle of flipping the internal cage, you can just lay the system on its side and set the CD-ROM holders on the drive tray to hold your CD-ROMs sideways.

Included on the case are small foot mounts so that the case sits evenly when changed to a desktop style. Gateway still uses six screws to hold the cover on the system, which makes getting into the case a little more difficult than some other systems.

However, Gateway soon will introduce separate tower and desktop cases with a more modern look and feel. Overall, we rated system design good.

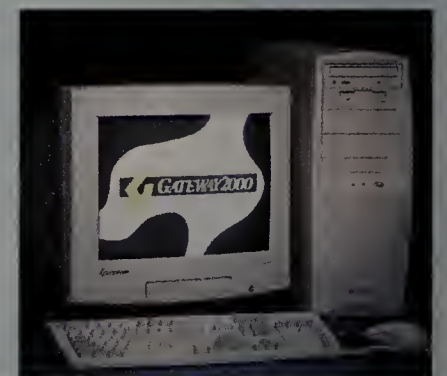
The expandability of the P5-200 is very

good. It comes with three 5.25-inch external drive bays and one 3.5-inch external drive bay and three 3.5-inch internal drive bays. All internal and external drives are held in place with screws.

The system also comes with two internal fans: one that mounts inside the power supply and one that mounts to the side of the power supply and pulls air directly across the heat sink on the CPU, which is a very effective way of keeping the CPU cool.

Internally, the system comes with three PCI, three ISA and one shared expansion slots, two DIMM slots and one cache slot. Total memory expansion for the system is 128M using two 64M SDRAM DIMM memory modules and up to 512K of pipelined burst SRAM cache.

We had trouble running Business Applications Performance Corp.'s SYSmark/32 benchmark on the Gateway system. Freelance Graphics crashed every time the system ran through the test script. We traced this problem to the ATI RAGE II+ graphics card, but we couldn't tell if the problem was hardware-or driver-related. After hearing about our problems, Gateway supplied us with a Matrox Millennium video card with 4M of memory that is also available on the GSA schedule. We encountered no problems running our benchmark with this card, and the system posted a respectable overall SYSmark/32 score of 182, which is



Gateway P5-200

Speed:

SYSmark/32	182
Word Processing	170
Spreadsheet	170
Database	165
Desktop Graphics	277
Desktop Presentation	187
Desktop Publishing	172

slightly above average for the 20 other systems we reviewed.

The GSA schedule price for this system, including the Matrox Millennium video card, is \$2,425, which is a middle-of-the-pack price compared with the other systems in our review.

Overall, Gateway has put together a solid, mainstream competitor. The new P5-200 offers a very good set of features at a reasonable price, and Gateway is known for giving its government customers good support.

Who offers you the best
value on servers and
desktop computers on
GSA Schedule?

(The answer may surprise you.)

DESKTOP, from Page 26

however, was kept down by shortcomings in system documentation.

We liked the design of the SMAC system. The modular chassis features quick-release tabs on the CD-ROM and floppy disk drives, a built-in 10/100 local-area network adapter and support for PC Cards. The hard drive, however, was secured to the system chassis with standard screws. We also found the process of properly aligning and installing the hard drive a little difficult. Despite these minor flaws, this was a good design.

Although SMAC included a getting-started manual, the company provided only partial labeling for port and cable connections. Despite this minor drawback, advanced video and sound card utilities were provided on CD-ROM, along with pre-installed IPX/SPX and NetBEUI network protocols. A Windows 95 CD-ROM also was included. Overall, we gave the SMAC system a score of good for setup.

The system fared slightly better, however, in the features category, posting a solid score of very good. Included in our evaluation unit was a 3.1G hard drive, a 16X CD-ROM drive, a 33.6 kilobit/sec data/fax modem, support for PC Cards and built-in networking. It also shipped with a pair of desktop speakers and a 128-bit graphics engine for enhanced multimedia.

Expandability was another solid category for the SMAC system, earning it a score of good. After factory configuration, we found three 3.5-inch

internal drive bays and two 5.25-inch external bays open. Holding the system back from earning a better score for this category, however, was the fact that only two expansion slots were available. Memory expansion was good, with up to 256M of RAM and 4M of video memory supported.

SMAC tied for 10th place on the SYSmark/32 benchmark competition, turning in a solid score of 181. Its scores in each of the SYSmark/32 categories were consistent across the board, with its best performance being a 247 in desktop graphics, which was still significantly behind the leaders in this category.

A \$1,892 price makes the SMAC Data System 200MMX one of the most affordable systems in the review. There's little doubt that with some minor improvements in system design and expandability, along with a complete user's manual, this system would be in close contention for first-place honors. This is a strong system with a lot of potential and no major drawbacks.

Deskpro 6000 MT

The Compaq system received very good scores in setup, features and documentation and posted scores of excellent in support policies and compatibility. It was also one of the faster machines in the comparison, with a SYSmark/32 score of 193. Unfortunately, a \$3,680 price prevented the Deskpro from ranking higher in our comparison.

Compaq earned a good score for system design. Removing the case cover is simple and reveals a nice, modular design with a quick-slide-out motherboard

and expansion card cage. An Adaptec 2940 Ultra SCSI host adapter was also included with our system, along with built-in networking.

The Deskpro's score of very good for setup was no surprise due to Compaq's reputation for bundling a fair number of utilities and reference guides with its systems. Although a quick-start guide does not come with this system, a Windows NT installation guide was provided along with extra utilities for backup, system rescue and configuration. Our evaluation unit also arrived pre-configured for network use.

Features were one of Compaq's stronger suits, earning a score of very good. We particularly like the 8X rewritable optical PD/CD combo drive. Further enhancing the system are a 4.2G hard drive, 512K of cache memory, Compaq's Intelligent Manageability Utility (DMI), a 64-bit graphics engine with 2M of VRAM, a microphone and several other system and network management utilities.

Compaq was able to hold the line on expandability with a score of good. The Deskpro arrived with four expansion slots free after factory configuration, but it had only two external drive bays and no internal bays available. System memory was comparable with the rest of the field, with up to 256M supported. Video memory on the Matrox Millennium graphics card can be upgraded to 8M.

The Deskpro 6000 tied the Millennia MME for second place in benchmark performance. Scoring a 193 overall, the Compaq system led the field in desktop publishing with a score of 215. It was also one of the

See **DESKTOP**, Page 34



NOTES FROM THE TEST CENTER

Dell Dimension Joins Schedule

► ANDREAS UITERWIJK

Dell Computer Corp. recently began selling its Dimension PCs, designed for small and home offices, on the GSA schedule. Will the existence of the Dimension and OptiPlex lines be confusing to government buyers? Probably at first. But the two lines are very different and meet distinct needs.

Dell's OptiPlex line, which is reviewed in the main comparison (Page 17), is a corporate system. That means it was designed for integrated environments where compatibility and networking are more important than speed. The Dimension, by contrast, is geared toward small workgroups that need the latest hard drive, video and other technologies. For government buyers, that means the OptiPlex is more appropriate for large-volume buys, while the Dimension is ideal for smaller purchases.

We took a quick look at the Dimension and found it to be a fine machine at a competitive price. While it's not the fastest system on the block, it is faster than the OptiPlex. And, of course, it comes with Dell's very good documentation and technical support.

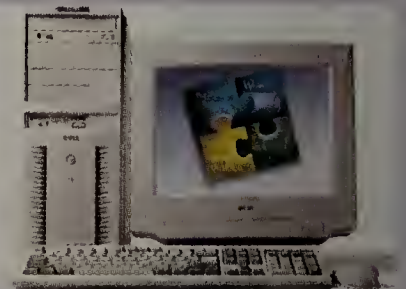
The Dell Dimension came to us in a minitower configuration packed with leading-edge hardware. The system came with 32M of SDRAM, a 512K single bank pipelined burst cache, a Western Digital Caviar 3G EIDE hard drive, an S3 video card with 4M of memory and dual USB ports. In the multimedia area, the system has a 12X IDE CD-ROM drive, built-in audio, microphone and Altec Lansing speakers. Also included are a Microsoft Corp. IntelliPoint mouse and a 17-inch monitor. It even comes with a 56.6 kilobit/sec US Robotics modem — the fastest of any system reviewed here. Overall, we rate the feature set very good. (Dell would have received an excellent score if a 10/100 Ethernet adapter and related software were bundled instead of being available for an extra charge.)

Along with the hardware, Dell has bundled a host of software packages and utilities. The Dimension comes pre-loaded with Microsoft's Windows 95, Office 97 and Small Business Financial Manager as well as Focal Point, a modem, e-mail and a fax software package. Additional utilities include on-line documentation, Dell's own Diagnostics software and a diskette factory icon that lets you make backup copies of drivers and other software on the system. With this software set, we rated setup very good. The only thing missing was an informative tutorial and multimedia presentation that Dell used to include with all its systems.

Dell's new case design makes it fairly easy for the user to access the components of the computer. The side case cover comes off by removing a single thumbscrew on the back and pushing down two tabs. The computer has all I/O connections on the back of the unit color-coded and clearly marked, which makes it easy for the user to plug in all the cables. The system comes with two 5.25-inch and three 3.5-inch external drive bays and two 3.5-inch internal drive bays. All internal and external drives are held in place with screws. The system also comes with two internal fans: one that mounts inside the power supply and one that mounts to the back side of the system case. The second fan pulls air directly across the heat sink of the CPU to help cool off the CPU. Overall, we rated system design very good. However, snap-out hard, floppy and CD-ROM drives would have made this system a true winner in this category.

Internally, the system comes with three PCI, three ISA and one shared expansion slots, two DIMM slots and one cache slot. Total expansion for the system is 128M using two 64M SDRAM DIMM memory modules. The system already comes with 512K of pipelined burst cache, so upgrading cache is unnecessary. We rated expandability very good.

We ran the SYSmark/32 benchmark on the Dimension and got an overall score of 181, placing it in the middle of the pack of



Dell Dimension

Speed:

SYSmark/32	181
Word Processing	160
Spreadsheet	104
Database	170
Desktop Graphics	250
Desktop Presentation	192
Desktop Publishing	157

our competitors and slightly ahead of Dell's OptiPlex. We think that if Dell used a higher-end video card, such as a Number Nine Image 128 or the Matrox Millennium, performance would have increased even more.

Dell's GSA schedule price for this computer is \$2,399, placing it 12th overall in the price category for all the systems we evaluated.

Dell has a good package with the Dimension. If you can live without the networking-oriented extras of the OptiPlex and want access to newer technologies, the Dimension may be right for you.

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Power Computing and Apple Vie for Mac Honors

► DAN CARNEY

In an attempt to serve the small but loyal group of government Macintosh users, we evaluated two 200 MHz-class PCs from Apple Computer Inc. and Power Computing Inc. Overall, we liked the design and features of the Apple system better, but Power Computing offers a faster and less expensive system that many agencies will consider a better deal.

Both the Apple Power Macintosh 8600/200 and the Power Computing PowerCenter Pro 210 represent the changing face of the market for Mac-compatible PCs. The Power Mac is still stylish but is now more affordable, while the PowerCenter Pro provides a functional equivalent in a less expensive, no-nonsense package.

But that doesn't mean Power Computing has no attitude; the company's press kit is labeled "Power Computing Propaganda." The company includes a set of stickers (and a cool mouse pad) with its PCs for buyers to use alongside (or instead of) Apple's fruit stickers.

Apple's prices have gone from excessive to typical for a top-tier computer, while Power Computing is closer to the PC clone end of the price spectrum. The Power Mac 8600, as equipped but with no monitor, costs \$2,982, and the AppleVision 1710 monitor we received costs \$744; both are available on Government Technology Services Inc.'s General Services Administration Schedule B/C. The combined price is \$3,726, which is still at the high end of desktop PC prices.

GTSI also sells Power Computing products on its GSA schedule, but the PowerCenter Pro 210 was not yet listed. The PowerCenter Pro core configuration lists for \$2,395, but the minitower enclosure we tested adds \$100; the additional 16M of RAM (for a total of 32M) is \$130, and the Power 17-inch display lists for \$629.

The combined total list price is \$3,254. The GSA price will be lower.

Both machines break with Apple's tradition of arriving sans keyboard and mouse unless you order them as extras. The full-size keyboards and one-button mice on both computers were very similar and very nice in design and execution. There is little difference in the appearance or tactile response of either company's input devices.

The vendors do diverge on monitors, however. Apple sticks with its usual 15-pin connector for the video display, while Power Computing supplies a standard VGA video output in addition to the Apple 15-pin design. This means that Power Computing can offer standard PC monitors with its computers or that customers can buy a less expensive PC monitor with their Mac clone.

Apple's 8600 looks like an 8500 with a box stuck on the side, but the appendage provides more room for additional features or upgrades. The case opens by pressing on the translucent green area to the left of the

top, although the case may be locked shut for security by using a padlock on the back. The side pulls away, and a cooling fan comes off with it. There are no wires to disconnect because the fan draws power from a pair of spring tabs that connect when the side is attached.

Release a couple of levers and the whole top half of the case swings away with the drive bays and power supply, providing unfettered access to the system board's three PCI slots and 12 DIMM slots (eight dynamic RAM and four video RAM). All three PCI slots are free, and one of the externally accessible drive bays is free. The 12X CD-ROM drive, Iomega Corp. Zip drive and 3.5-inch Superdrive fill the other three external bays, while the 2G SCSI hard drive is buried deep inside the single internal bay. The processor is on a removable card for easy upgrades in the future.

The PowerCenter Pro, in contrast, uses a generic PC minitower cabinet. The cover attaches with a quartet of thumbscrews in the rear, but access is not good even with the lid off. Instead, you need to break out the Phillips-head screwdriver to take the bottom panel off to get a better look at the innards. One problem is that the three PCI slots are on a riser card that is perpendicular to the system board. Any cards in the slots extend horizontally, covering the board, and the slots are not empty from the factory.

While Apple has the SCSI port built into the system board, Power Computing uses an Adaptec Inc. PowerDomain Fast/Wide PCI SCSI card, which leaves only two free slots, and the card itself hampers access to the rest of the components. The unremarkable cabinet houses the same number of drive bays as the Apple, but it has two bays free because it doesn't include a standard Zip drive. It has four DIMM slots for memory. Like the Apple, the Power Computing system's CD-ROM drive is a 12-speed, and the processor is on an upgradable card.

The PowerCenter Pro may not win any industrial-design accolades, but it's a faster system. At 210 MHz, the Power Computing machine revs its Motorola Inc. PowerPC 604e chip 5 percent faster than the Apple 8600's 200 MHz processor. Power Computing also boasts a 60 MHz system bus, compared with Apple's 50 MHz bus. Additionally, the PowerCenter Pro has 1M of secondary cache memory to help speed data on its way through the system bus, while Apple only provides a maximum of 256K of secondary cache.

We asked our sister publication, *Macworld*, to benchmark the performance of these two systems. Macworld Lab's benchmark runs eight key applications — Adobe Systems Inc.'s Illustrator 5.5, PageMaker 5.0a,

Photoshop 3.0 and Premiere 4.0; Fractal Design Corp.'s Fractal Design Painter 2.0; Microsoft Corp.'s Excel 5.0; Specular International's Infini-D 2.6; and Wolfram Research Inc.'s Mathematica 2.3 — plus the finder. The

Apple Power Mac 8600 had an overall score of 7.75, while the PowerCenter Pro scored an 8.91 (see chart below).

Both machines were equipped with 2G Ultra SCSI hard disk drives, 32M of RAM, 17-inch displays, 2M of video RAM (expandable to 4M), three PCI expansion slots, Ethernet 10BA SE-T and AAUI ports, Local-Talk ports and DIMM slots that hold a maximum of 512M of RAM. These

systems come with so much RAM because many users are run animation, video-editing and other memory-intensive applications.

These machines feature accelerated 3-D graphics, but the Apple goes one better, with S-video and composite-video inputs. It also includes VideoShop, a video editing application from Strata Inc., so that users can create their own QuickTime movies using video imported from a VCR or camcorder. The other application Apple bundles is its own Internet Connection Kit. Apple installed Version 7.5.5 of the Mac OS on the tested system, while Power Computing installed Version 7.6.

Power Computing includes free software with the PowerCenter Pro that it claims is worth an additional \$1,000. This bundle includes Corel Corp.'s Gallery; Creative Multimedia's Blockbuster Guide to Movies and Videos; Fractal Design's Dabbler 2 art tutor; and Now Software Inc.'s Contact and Up-to-Date contact and schedule management software.

The documentation and customer support areas are close, with the advantage going to Power Computing. Both companies provide toll-free support lines and man the phones 12 hours a day on weekdays. But Power Computing has weekend support hours too, which gives it an edge in this area.

In documentation, Apple's user's guide has slightly better illustrations and layout. Power Computing's guide has the customer support phone numbers right in the front, where they are easy to find, while Apple puts all that information in a separate Guide to Apple Customer Services. Power Computing tips the scales in its favor by throwing in Hayden Books' *Guide to Macintosh System 7.5.5* by Mac guru and columnist Don Crabb. This book includes a glossary, which neither company's user's guide includes. Both user's guides have extensive troubleshooting sections.

The PowerCenter Pro is faster and less expensive than the Power Mac, while Apple includes extras such as video importing and editing capabilities and a Zip drive. But the Apple is more expensive and a little slower. It's your call: style and luxury vs. bang for your buck.

— Carney is an FCW contributing writer.



Power Computing's PowerCenter Pro 210



Apple's Power Macintosh 8600/200

Macworld Benchmark Results — Speed Scores for Typical Applications (Higher Scores Are Better)

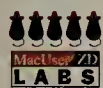
	Overall (Core) Score	CPU-Intensive	Floating Point-Intensive	Disk-Intensive
Apple Power Mac 8600/200	7.75	7.86	11.65	2.48
Power Computing PowerCenter Pro 210	8.91	8.99	12.90	3.63

Overall Score: Indicates typical performance in corporate environments.
CPU-Intensive: Indicates performance for most business and personal tasks.
Floating Point-Intensive: Indicates performance for analytical, 3-D and other specialized uses.
Disk-Intensive: Indicates performance of data transfer capabilities, which affects all users.

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DESKTOP, from Page 28

four systems to break the 300 mark on the desktop graphics portion of the benchmark.

Despite its weighty price tag, the Deskpro 6000 was solid across the board. However, better scores in technical support, expandability and system design may have moved this system up several positions in the overall review.

Equium 5200D

With the exception of benchmark performance and documentation, the Toshiba Equium 5200D was highly competitive, turning in scores of excellent in system design, setup and technical support. The result was a sixth-place finish with a final score of 7.51.

A few special features helped earn the Toshiba system a score of excellent for system design. One was the wide palm rest on the system's keyboard. Another was an obscure button in the upper right corner known as the "Secure Sleep and Instant On" button, which allows system administrators to access the system over a local-area network without compromising security. The icing on the cake was the integration of audio, video, networking and two USB ports in the unit's design.

Despite the lack of a quick-start guide, the Equium still received an excellent score for setup. Graphical labels helped eliminate much of the guesswork associated with connecting cables and peripherals. Toshiba also provides a dual-install option through which users can choose between Windows 95 and Windows for Workgroups. However, what really set Toshiba apart was a bundled CD-ROM containing all the necessary drivers and the fact that this system arrived pre-configured for Novell and Microsoft networks.

At the top of the Equium's good feature list were its built-in 10/100 network adapter and pre-loaded LAN-Desk Client Manager software. Additional features included a 2.5G hard drive, 256K of cache memory, a 12X CD-ROM drive, infrared port and a 64-bit graphics engine with 4M of memory. Overall, these features earned Toshiba a score of good for the category.

The system's expandability was also good, with up to 192M of EDO DRAM supported. Unfortunately, the system is limited to 4M of video memory and 256K of cache memory. Four free expansion slots (two ISA, one PCI, one shared) make up somewhat for the lower video and cache memory.

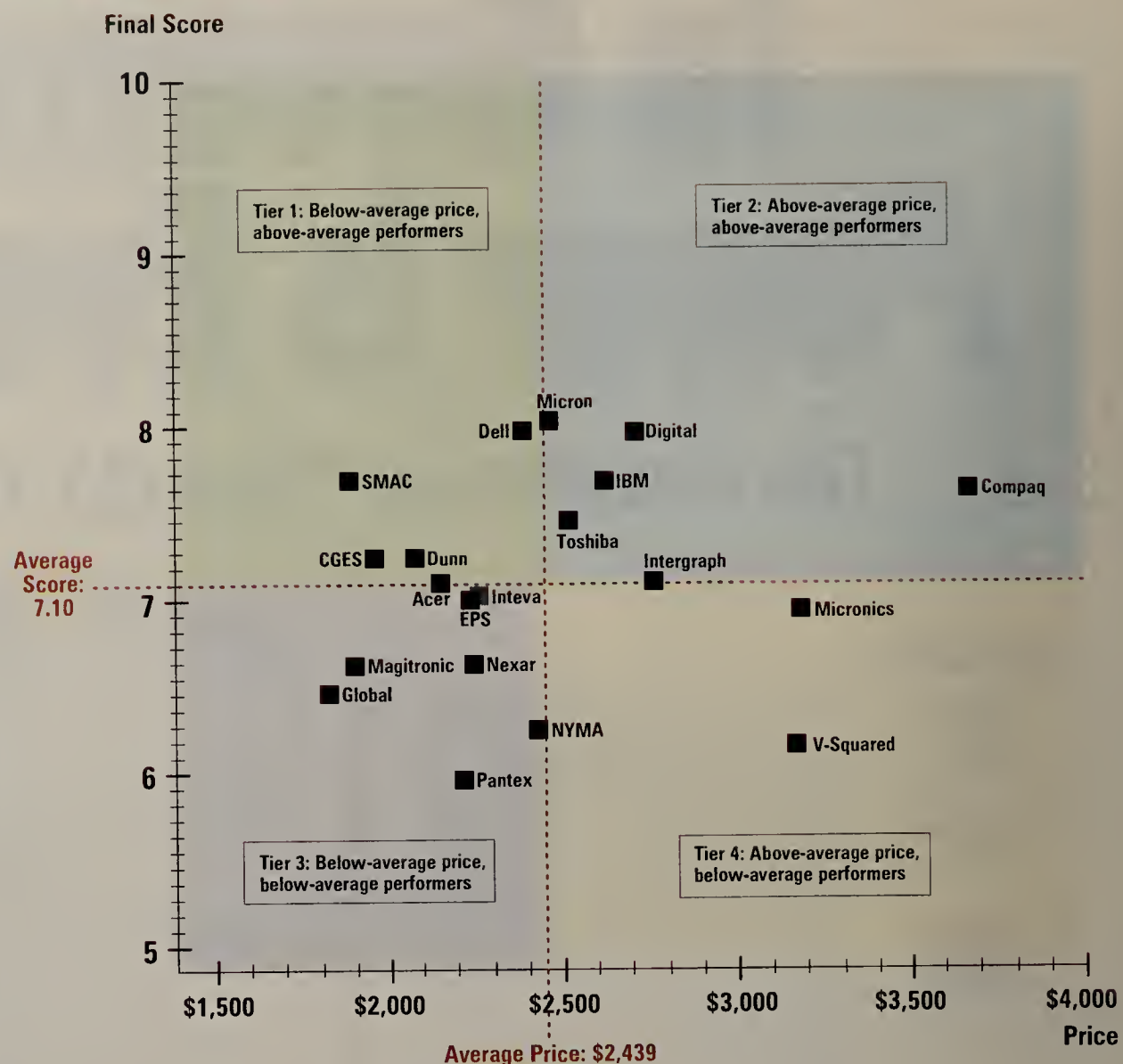
The Equium had some difficulty handling the SYSmark/32 benchmark, barely staying out of last place with a final score of 164. If you recall our January story on Windows NT workstations, several systems that used a Graphics Pro Turbo Mach 64 card from ATI Technologies Inc. also had a rough time, particularly on the non-graphics portions of the benchmark. The Toshiba system uses an ATI 3-D RAGE II card with only 4M of memory. This, along with its lesser cache size, may have contributed to the Equium's poor performance.

At \$2,507 on the GSA schedule, the Equium is competitively priced. Buyers should keep in mind that its benchmark performance will improve with more video and cache memory. However, improvements in documentation will be required before it will have a chance to surpass systems such as the Millennia.

Dunn K6 200

Despite its seventh-place showing, there were few drawbacks to the Dunn K6 200, which had an overall score of 7.27. Slight improvements in setup, system design and features would have helped this competitively priced

Price/Performance Leaders



and solid performer fare better.

Overall, the system design was good, except for one drawback: The memory sockets were obstructed by the power supply, which makes upgrading difficult. Other than that, the design was nice and modular. The motherboard and hard drive were both mounted on a removable back panel that easily slid out of the chassis. We also appreciated the ergonomically designed keyboard for enhanced typing comfort.

The Dunn system was similar to the machine from CGES in that it is very straightforward, with few bells and whistles. Although there was no quick-start guide with the unit, Windows 95 comes pre-loaded, and all the ports and cable connections are marked clearly. Dunn also bundles a handy advanced management and configuration utility for the video card. In the end, the Dunn K6 received a score of satisfactory for setup.

The feature list of the Dunn system earned a score of good, with a roomy 3.5G hard drive. Also included were 512K of cache memory, a 16X CD-ROM drive and the integration of SIMM and DIMM memory sockets.

Expandability was one of three categories in which Dunn earned a score of very good. There were five free expansion slots after factory configuration, along with two external and one internal drive bays. This was a very competitive combination in comparison with the rest of the field. Maximum cache memory is 512K, and the system supports up to 256M of RAM.

The Dunn K6, like other systems we have tested, fared well in performance. It posted a 183 on the SYSmark/32 to finish in eighth place overall. It was also only five systems behind the leader in desktop graphics, with a score of 292.

Buyers can find the Dunn K6 on the GSA schedule for \$2,149. It was the highest ranking of the five K6 sys-

tems we tested. And with a score above 7.0, it gets our nod as a good performer at an affordable price.

Plus Data Systems

The Plus Data Systems unit from CGES made its way into the top 10 with a good design and very low price; however, it had satisfactory scores for setup and features and a 13th-place showing on the SYSmark/32 benchmark. It tied for seventh place with the Dunn system, with a final score of 7.27.

We've become accustomed to the lack of bells and whistles in the Plus Data's design. Nonetheless, it still earned a score of good for this category. The system has easy-to-access components but lacks quick-release features. It does include the two USB ports found on most systems. One design feature that hasn't changed over the past several incarnations of the Plus Data machine is the difficult-to-remove rear bezel.

Setup was satisfactory despite the lack of a quick-start guide. Although we order our systems to come with the operating system pre-loaded, Windows 95 was only partially loaded on the Plus Data unit, requiring us to complete the installation.

The Plus Data machine received a score of satisfactory in the features category. The system's feature set included a 2.5G hard drive, 256K of cache memory, a 12X CD-ROM drive, a pair of desktop speakers and a 64-bit graphics engine with 2M of memory.

Unfortunately, the system from CGES was one of six systems that were unable to break the 180 mark on the SYSmark/32. It had a final performance score of 175, which was led by a desktop graphics score of 274. Extra cache and video memory probably would improve these numbers.

The Plus Data machine was priced at \$1,947, which

places it securely in the top five systems as far as affordability is concerned. We'd like to see CGES add an extra 2 or more megabytes of video memory for enhanced performance. Otherwise, this is a solid system.

AcerPower

Acer was one of only two vendors to earn a score of poor for technical support. Nevertheless, it earned a score of 7.10, edging out the system from Intergraph.

Acer's "screwless" computer housing makes accessing the system's internal components very easy and helped earn it a score of good for system design. The motherboard and floppy drives were modular and easily removable. In addition, the system ships with a cache upgrade module, which was occupied on our evaluation unit for a total of 512K of cache memory. Rounding out the design were two USB ports and support for infrared.

The AcerPower fared better in setup, earning a score of very good. As with many systems in the review, no quick-start guide was included with this system, but all of its ports and cable connections were labeled clearly. Acer also ships a useful hard drive recovery utility on CD, which earned extra points. Although the AcerPower arrived at our test center DMI-compliant, Acer did not bundle the management software with the system. We had to complete the DMI configuration by entering system part and model numbers.

The AcerPower received a score of good for the features category. Included were a 3.5G hard drive for slightly enhanced storage capacity, 512K of cache memory, the fastest CD-ROM drive of the field (20X) and a pair of desktop speakers.

After factory configuration, the AcerPower provides four free expansion slots for adding components. It also is capable of supporting up to 384M of ECC EDO memory — second only to the systems from Dell and Magitronic. A field upgrade cache module is available. Overall, Acer earned a very good score for expandability.

Although it posted middle-of-the-road performance numbers, the AcerPower was competitive. Its final score

on the SYSmark/32 was 181, placing it in a tie with the SMAC system for 10th place in performance.

The AcerPower is very competitively priced at \$2,179, placing it well into the top 10 of the most affordable systems in the review. Better technical support would have helped this system move higher up the list.

TD-25

Intergraph was one of the more consistent and solid performers in the review, placing 9th with a final score of 7.09. A very good score in setup helped to anchor this system firmly in the top 12.

The TD-25's score of good for system design was largely the result of Intergraph's incorporation of a locking drive bay panel for the security of external drive bays and a nicely designed multimedia keyboard. The keyboard sports integrated speakers in each corner along with ports for headphones, audio-in and a sub-woofer. Two USB ports are included for peripheral expansion. However, we didn't find any particularly modular components.

The cornerstone of the TD-25's score of very good for setup was Intergraph's InterSite intelligent PC management utility. InterSite includes an extensive thermal sensing system as well as security and fault-prediction features that help prevent loss of critical PC assets. In addition, a configurable watchdog alerting program notifies system managers over the network of critical events. InterSite also features utilities for managing software versions and reporting hardware configurations. In addition to arriving with the applications and operating system pre-loaded, our evaluation unit shipped with a Windows 95 CD-ROM and provided us with the option to create a rescue disk at boot-up.

A 3.5G hard drive and 12X CD-ROM drive were at the forefront of the TD-25's feature list, to which we awarded a score of good. Also included were 512K of cache memory, a 64-bit graphics engine with 2M of memory on the board and 2M located on the expansion card, two USB ports, 32-bit audio, desktop speakers and a microphone for use with the multimedia keyboard.

Intergraph finished in ninth place on the performance meter, with a final score of 182 on the SYSmark/32. Of the individual SYSmark/32 applications, its desktop presentation score of 186 was one of its more competitive results.

A \$2,781 price on the GSA schedule places the Intergraph on the higher end of the cost spectrum, along with the systems from V-Squared, Micronics and Compaq. However, this system can turn in some impressive performance numbers and is solid across the board.

Inteva K6 200 Multimedia

A SYSmark/32 score of 207 helped to keep the Inteva K6 in the top 13. However, its satisfactory performance in vendor support policies and technical support kept it from rising higher in the list.

One design flaw we noticed was that the system's serial, parallel and USB ports were wired to the motherboard and obstructed access to one of the adjacent ISA expansion slots. However, we liked the modular floppy drive and easy-to-access video memory. The system's design also accommodated a total of seven expansion slots and five external drive bays.

At the center of the Inteva's good feature list were a 2.1G hard drive, a 16X CD-ROM drive, a pair of desktop speakers and 512K of cache memory. Our evaluation unit also shipped with a 64-bit graphics engine and a 33.6 kilobit/sec data/fax modem. Rounding out the system's feature list were several software titles, including Corel Corp.'s WordPerfect Suite 7, Compton's Interactive Encyclopedia and Matrox Graphics Inc.'s PowerDesk advanced video card utility.

The Inteva's two best scores came in expandability and compatibility, where it earned scores of very good and excellent respectively. After factory configuration, the system provides four free expansion slots as well as three external and two internal drive bays. The system's memory is relatively robust, supporting up to 256M via two DIMM sockets or up to 128M if you use the four available SIMM sockets. Video memory also can be

See DESKTOP, Page 36

SYSmark/32 Benchmark Results — Speed Scores for Office Applications (Higher Scores Are Better)

	SYSmark/32	Word Processing	Spreadsheet	Desktop Presentation	Desktop Graphics	Desktop Publishing	Database
Acer	181	169	183	185	263	184	174
CGES	175	168	176	176	274	164	162
Compaq	193	198	177	196	348	215	171
Dell	174	170	174	170	266	161	166
Digital	177	165	179	184	296	159	166
Dunn	183	189	170	177	292	191	174
EPS	191	179	211	186	310	177	159
Global	148	146	148	139	229	141	147
Intergraph	182	177	177	186	286	177	168
IBM	190	189	186	189	247	186	183
Inteva	207	204	190	207	361	202	206
Magitronic	180	180	173	171	283	162	165
Micron	193	183	193	186	372	171	165
Micronics	185	177	183	188	268	168	178
Nexar	169	166	188	165	263	161	158
NYMA	188	177	189	192	276	172	177
Pantex	190	188	179	188	285	175	195
SMAC	181	174	182	183	247	166	174
Toshiba	164	158	159	170	242	161	156
V-Squared	192	199	185	178	229	196	201

expanded to a healthy 8M.

As mentioned earlier, the Inteva system blew away the competition on the SYSmark/32 with a final score of 207. In addition, it took top honors in three of the six SYSmark/32 applications: word processing, database and desktop presentation.

Government buyers can soon find the Inteva K6 on the GSA schedule for \$2,249. This price includes a 2.1G hard drive, 17-inch monitor, 16X CD-ROM, 4M of video memory, a 33.6 data/fax modem, 32M of memory and a pair of desktop speakers.

Evolution "G" Series

The Evolution "G" Series from EPS was the last of the systems to score 7.0 or higher. Poor documentation, however, kept an otherwise good system from being more competitive.

The EPS system was right up there with the leaders in the performance category. It scored a 191 on the SYSmark/32 and led the field in the spreadsheet portion of the benchmark, with a score of 211.

The system earned scores of good across the board for system design, setup and features. However, several design features that were present on many of the leading machines — such as USB ports, infrared ports, integrated video and integrated networking — were noticeably absent on this system. The design also lacked modular components for easy installation and removal. Still, its score of good was buttressed by easily accessible system memory and a total of six expansion slots and five external drive bays.

Setup for the Evolution was rated good. It came with a pre-installed network interface card along with good labeling of the ports and connections and on-line documentation for the audio and graphics cards. Drivers for the LAN card were also provided, and the system booted network-ready.

The system received a score of good for its feature list, which included a pair of desktop speakers with a subwoofer, a 16X CD-ROM drive, 64-bit video and a maximum on-board cache of 512K. Additional features included a microphone and 10/100 PCI network adapter.

The Evolution "G" Series is competitively priced at \$2,225 on the GSA schedule. This system offers good performance for the price, but it needs better documentation before it will have a chance to be a best buy.

Summary

Buyers should take note of the fact that three of the top five systems all scored excellent in support policies and technical support. More importantly, the top seven systems all scored 7.5 or higher and offer well-rounded systems. The major differences to look for are in features and benchmark performance. If price is the most important factor for your agency, the systems from Acer and SMAC are within the top 10 most affordable machines. Still, with only two scores of poor throughout the entire top 13, these systems are all worth a look.

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The Rest of the Competition

Nucleus Pentium MMX

The standouts for the Micronics system were its scores of very good for technical support, support policies and expandability, along with an excellent score for compatibility. Unfortunately, a satisfactory score for setup and features held back what was a good design and highly competitive performance. The final score was 6.91.

Overall, we found the system's design to be modular, with an easily removable motherboard and CD-ROM drive. The cabinet is very roomy, and there are no obstructions when working with internal components. After factory configuration there are four expansion slots available and three external drive bays. Although mounting brackets were provided on the inside of the case for one internal drive, Micronics did not provide any hardware.

The Micronics system ships with an average feature set, which includes a 2.5G hard drive, a 12X CD-ROM drive, a 64-bit graphics engine, 512K of cache memory and a pair of desktop speakers.

A final score of 185 on the SYSmark/32 put the Micronics system in seventh place overall in performance. Unfortunately, these competitive performance results were held back by the \$3,199 price.

G-K6200-FMX4

At \$1,892, the Magitronic system was tied for the second most-affordable system of our review. But it takes more than a low price to come out on top of one of our comparisons. In the end, poor scores in setup, documentation and technical support contributed to this system's 13th-place finish. Its final score was 6.71.

The Magitronic system's highlights were its features list and expandability, where it posted scores of very good, and its benchmark performance. For a very low price, buyers will get an excellent software bundle, a 33.6 kilobit/sec data/fax modem, headphones and a pair of desktop speakers. Added to this was a 2.1G hard drive, a 12X CD-ROM drive and a 64-bit graphics engine with 4M of memory.

Despite the fact that the system's two open PCI expansion slots were taken up by the serial port and could not be used, the Magitronic still was able to walk away with a score of very good for expandability. The system's memory expansion was optimal, with 512K of cache available, up to 512M of DRAM and 8M of video memory. There were also four 3.5-inch internal drive bays available after factory configuration.

Magitronic's system fared well in benchmark performance, where it posted a final SYSmark/32 benchmark score of 180. Contributing to this score were relatively competitive performances in the database and desktop-graphics portions of the benchmark.

Buyers can find this bargain on the GSA schedule. However, you'll have to weigh the options of getting more features for your dollar at the cost of poor technical support and documentation.

Nexar II

The two main reasons the Nexar system did not fare better in this comparison were its score of 169 on the SYSmark/32 benchmark and only satisfactory scores in features, documentation and technical support. However, it was able to post good scores in setup and expandability as well as an excellent score in compatibility. Its final score was 6.70.

Our evaluation unit shipped with a very helpful quick-start guide and also included a Windows 95 interactive tutorial on CD-ROM. However, a minimal num-

Price/Performance Ratios

Vendor	Price	SYSmark	Cost Per Point
SMAC	\$1,892	181	\$10.45
Magitronic	\$1,892	180	\$10.51
Inteva	\$2,249	207	\$10.86
CGES	\$1,947	175	\$11.13
Pantex	\$2,205	190	\$11.61
EPS	\$2,225	191	\$11.65
Dunn	\$2,149	183	\$11.74
Acer	\$2,179	181	\$12.04
Global	\$1,826	148	\$12.34
NYMA	\$2,409	188	\$12.81
Micron	\$2,478	193	\$12.84
Nexar	\$2,249	169	\$13.31
Dell	\$2,398	174	\$13.78
IBM	\$2,625	190	\$13.82
Digital	\$2,705	177	\$15.28
Intergraph	\$2,781	182	\$15.28
Toshiba	\$2,507	164	\$15.29
V-Squared	\$3,190	192	\$16.61
Micronics	\$3,199	185	\$17.29
Compaq	\$3,580	193	\$19.07

ber of software titles and utilities were provided.

On the expandability front, the Nexar was a little more competitive. It provided a whopping six free expansion slots after factory configuration along with a maximum of 128M of SIMM memory and 256M of DIMM.

Although it received a score of satisfactory for features, some of the highlights included a 3.1G hard drive, a 16X CD-ROM drive and 512K of cache memory.

The Nexar II is available on the GSA schedule from Government Technology Services Inc. for \$2,249.

InSync

The InSync system from Global InSync Inc. was the lowest-priced system in the review, with a price of \$1,826. However, a satisfactory feature list and a final score of 148 on the SYSmark/32 were enough to dilute the effectiveness of good scores across the board.

One of the InSync's most notable design features was its integrated stereo speakers. However, they were wired to the sound card via external jumpers. In addition, I/O ports were connected to the motherboard with cables that hampered accessibility. As a result, we found it somewhat difficult to get to the system's memory slots.

Some of the system's better features were a 3G hard drive, a 12X CD-ROM drive, a MIDI game port and stereo speakers integrated into one of the 5.25-inch drive bays.

The InSync machine had trouble on the SYSmark/32 benchmark, trailing the rest of the field by a wide margin. Its best score was in desktop graphics, where it posted a 229 — still more than 140 points behind the system from Micron in this category.

The InSync machine is a good system overall if you don't need speed and aren't looking for a lot of extra features. Government buyers can find the InSync system on the GSA schedule.

NYMA Pentium MMX

The NYMA machine ended up in 16th place because of only satisfactory scores in several important categories: setup, features, support policies and technical support.

The overall system design, however, was good. Included were integrated audio and USB ports as well as seven expansion slots. Although the motherboard is screwed to the chassis and provides little benefit in terms of modularity, there is plenty of room inside the case. The hard drive also was secured with screws, two of which were obstructed by the back panel of the chassis and were difficult to remove. The CD-ROM drive easily slides out after removing the front bezel.

The NYMA system posted a competitive sixth-place finish on the SYSmark/32, with a final score of 188. It performed particularly well in desktop graphics, spreadsheets and desktop presentation.

The NYMA Pentium MMX system is available to government buyers on the GSA schedule for \$2,409.

200 MHz K6 System

The 200 MHz K6 System from V-Squared Inc. received a final score of 6.17. Scores of satisfactory in setup, support policies and technical support were enough to relegate this speedy, third-place finisher on the benchmark tests to 17th place overall.

Like the NYMA system, the 200 MHz K6 from V-Squared posted a score of good for system design. The motherboard is relatively modular and easily slides out of the chassis after removing two screws. The CD-ROM drive was also equipped with quick-release tabs for easy removal.

This system provided a standard case with plenty of room for expansion cards. It was also one of the only systems to ship with an Ultra/Wide SCSI adapter and dual cooling fans for the hard drive.

Benchmark performance was one of this system's better categories, turning in an impressive score of 192 on the SYSmark/32. This score put it in third place overall for performance.

The one saving grace for the system from V-Squared is that it didn't post any poor scores.

However, with a slightly higher price, government buyers will demand improvement in those areas in which it scored a satisfactory. Government buyers interest-

ed in the system from V-Squared can find it on the GSA schedule from PC-Expanders Inc. for \$3,190.

Amera 200/A

Pantex Computer Inc., a newcomer to our review, ended up in last place because it received only satisfactory scores in six categories.

The Amera was also the only system unable to break the six-point barrier, posting a final score of 5.96.

The two areas in which the Amera performed well were benchmark performance and expandability.

The system tied the IBM PC 350 on the SYSmark/32, with a

final score of 190. Helping to earn the system a score of good for expandability were four free expansion slots and two free external drive bays after factory configuration.

However, there were no available internal drive bays for additional components.

Also worth mentioning is the

system's multimedia support in the form of a 12X CD-ROM drive, desktop speakers and a headset with microphone. Pantex also preloads Lotus SmartSuite.

At the time of this writing, Pantex was awaiting approval of its GSA schedule for the Amera 200/A. However, buyers can find it for a list price of \$2,205. ◀

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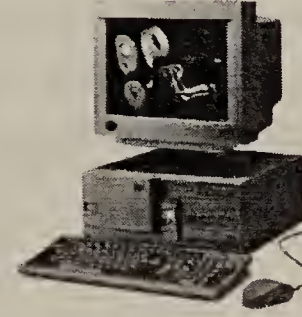
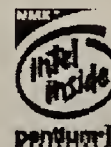
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Pushing Your Buttons

New Tools for Government Intranets

► LISA STAPLETON
AND L.L. HART,
WITH NICHOLAS JOURIN

As government workers tire of browsing slow and often outdated World Wide Web sites, they're showing more interest in a new model of Internet information sharing called push technology. Our reviewers evaluated three of the leading packages that allow agencies to broadcast important information to workers.

The Internet is getting to be a pretty pushy place, as organizations experiment with server-push technology, a phrase that refers to a variety of technologies for putting information in people's faces.

It differs from pull technology, in which users actively seek out information, usually through a browser. It's controversial for a variety of reasons, not the least of which is the idea that someone else — usually an information systems department, or sometimes, as with PointCast Inc. products, the vendor — is controlling the flow of information to the desktop.

A number of government organizations are experimenting with server-push technology. For instance, the National Imagery and Mapping Agency is working on the development of scalable "libraries" for imagery and geospatial information. The agency hopes the development will greatly enhance the ability of a user to receive desired information and products "on demand," by pulling them from higher echelon libraries

to the user's own library, or by having it "pushed" from the higher echelon on the basis of pre-registered profiles.

Despite the promise that push technologies offer, they are still pretty immature, not well understood and often come with hidden problems. An anonymous intelligence source said: "When we actually had folks deploy under a crisis situation (Haiti/Cuba), and every pipe was turned on to pump imagery and the like into the same-sized hard drives, the response was immediate. Everything stopped." This nightmare led to a serious re-evaluation of push technology. "That's when they started seriously looking at the 'smart push/smart pull' method," the source said. "[They] were to stage the data on their servers and send a note to the deployed user that it was available for immediate pull. On some occasions, a small amount could be sent ahead, but too much info was viewed in the same light as today's 'spam' e-mails."

Cautioned another retired gov-

ernment official contemplating server push: "You're taking up critical time on the user's only outbound pipe pushing information he did not want or may already have."

The players in push technology are quite diverse. Their revenue models are different, and the products themselves vary radically in the way they work and the functions they perform. Many vendors are creating their first products, and some are drastically reworking their existing products based on market feedback. (See the sidebar, Page 40, about other push products that weren't ready for this review.)

Some vendors make money by selling pre-packaged content and ads. In this case, you don't pay much for the technology but are somewhat limited as to what you can do to customize the product or the content's look and feel for intranet use, which is what most government agencies want. Still others are all-purpose file-pushers that don't care whether they're pushing software such as applets



IN THE NEWS

PointCast's Government Insider

► LISA STAPLETON

After looking at the other PointCast channels, I was prepared to write off the company's yet-to-be-released Government Insider as another 'who cares' channel. Much of the PointCast content, it seems, is the high-tech equivalent of the TV broadcast situation: 57 channels and nothing on. I mean, if you read a newspaper regularly, listen to public broadcasting channels or watch CNN, why should you need or want to see all the same information on your Internet feed as well?

I was quite pleasantly surprised by this hot-off-the-press alpha release; there is a "there" there on Government Insider. The content on this national government news channel alone is worth installing the client and learning to use it, even if you ultimately decide not to buy the PointCast I-Server to add intranet capabilities.

The main areas of coverage include Defense, legislative news and a government management news button from Government Executive magazine. You can customize the product to follow news focused on different areas of interest, including government technology use and House and Senate committees. (Relevant judicial decisions are covered within other areas.) This is a nice feature, although you're currently limited to a maximum of 10 choices. Calendars, which are updated daily, include House and Senate committee meeting schedules, summaries of

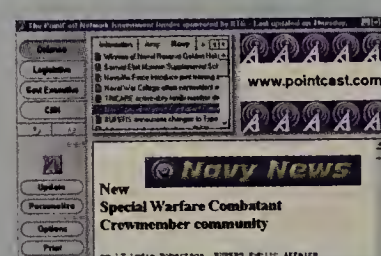
legislative actions taken and contemplated, and upcoming speeches by government leaders. The Defense area includes news of the Pentagon and the different branches of government, as well as reports of government contracts.

Like all PointCast clients, Government Insider keeps track of broad categories such as your gender and age, and tries, as much as possible, to customize the content you see. As with PointCast, you also can track general issues such as technology or the marketplace, and you can pick from several dozen major metropolitan newspapers. For instance, when we subscribed as a male in the 54-to-65-years-old category, we got a lot of news about pensions, retirement plans, lump-sum distributions, and government death and health benefits.

The negatives? Customization involved going through the Options

and Personalize menus, and as with the regular PointCast Client, this scheme seems to invite confusion for end users because it isn't very easy to remember which operations fall under each menu. Government Insider also seems somewhat less interactive than the other channels, with most of the content consisting of static HTML links rather than being more applet-based. But this will probably disappear in the released version, a PointCast spokesperson said. Finally, all the drawbacks mentioned in the review of the PointCast Client apply to this channel as well.

The Government Insider channel, like other PointCast stations, is ad-sponsored and free to end users. It is expected to become generally available sometime later this year.



or updated programs. Some products, such as Marimba Inc.'s Castanet and soon, PointCast's product line, let you publish to the wider Internet, while others are primarily for creating internal channels. Prices vary widely, from free to tens of thousands of dollars for 25 clients. Quality also varies. Because this field is immature, you might want to experiment with this technology but wait six months to a year to deploy it to everyone in your organization.

We reviewed three leading push products: Marimba's Castanet, PointCast's I-Server and StarBurst Communications Corp.'s Multicast Server. Our favorite was Marimba's Castanet, which is flexible enough to handle almost any kind of data, easy to use and inexpensive.

Castanet Transmitter 1.0/ Tuner 1.0

Of the push products we tested, Castanet was the most flexible and easiest to use. That's why the software received an overall score of very good.

Castanet rated high on expandability, multiple-platform support (because it's Java-based), ease of use and flexibility. It also handled caching easily, which is PointCast's traditional territory. It makes a wide variety of third-party content available to you, although no one is currently producing a special government channel. But you also don't have to see ads on Castanet channels, unless the provider of the channel forces you to do so.

The Castanet Transmitter is the server, and the Tuner is the client. (The tuner technology will soon be incorporated into a new generation of Netscape Communications Corp. browsers, according to both companies.) Bongo, a third-party developer tool, is available in a beta version that can be downloaded from the Web.

The software is available on multiple platforms, and what is of the most interest to government users is that the server is available on Unix and Microsoft Corp.'s Windows NT. Security was good. The Transmitter lets you set up trusted nodes, and there is password-access control on the publishing tools if you want it. You can have multiple sites within your company publishing to a channel, which is nice. Because it's Java-based, and Java itself provides a fair amount of built-in security, you get some extra protection from that.

It was very easy to install and



Castanet Transmitter 1.0/ Tuner 1.0

Marimba Inc.

(415) 328-5282

www.marimba.com

Price and Availability

Transmitter retails for \$1,000 for 100 end users during any one-hour time period (\$10 per user), but Tuner is free. Volume discounts are available. The software will be added soon to the GSA schedule.

Remarks

Castanet supports Windows NT and Unix, and it transmits virtually any type of data imaginable. It's easy to use and configure, but the interface could use some work.

Final Score

Very Good

configure the product, even for those of us who are documentation-averse. After installation and initial configuration, we were able to play with it for a little while, read a little bit of the on-line documents, and create and publish to a channel in about an hour.

The Castanet Transmitter gives you a choice of script-based or graphical user interface administration. You can use both or just the one you prefer. You also can build scripts into hooks in the product, if you want to do complicated customization work.

A big plus is that you can push anything with Castanet: Hypertext Markup Language, text, pictures, audio, video, and most importantly, software, so you can use it for administering large networks where everyone needs to have the most current version of software programs.

This ability is crucial to many of Castanet's customers. "It answers the question, 'How do you manage applications in an environment where change is

continuous, and you cannot tell the difference between content and software most of the time anyway?," said Jon Lowell of MECA Software, a company that provides financial software to banks, which in turn brand the software with their logo and content as a marketing and customer-service tool. He added that Marimba's business model was ideal for him: "The others just wanted to be a provider of some content, service or ad."

There were few negatives. Castanet's interface still needs some work because it doesn't give the impression of a well-crafted user interface for the rest of us, and it doesn't give the sense of a mature product. It also is somewhat of a resource hog, and it's running the Java Development Kit 1.0.2, which is a rapidly aging version of Java.

The biggest negative is the price, which isn't outrageous but isn't exactly free either. Marimba's Castanet Transmitter (for Solaris, Windows NT or Windows 95) costs \$1,000 for 100 end users during any one-hour time period (\$10 per user). That's about what it used to cost for a PointCast I-Server, which is now free and is, therefore, beginning to look better than it otherwise would.

Volume discounts are available; it will cost you just \$10,000 for 1,500 concurrent users, a cost of a little more than \$6 per user. An unlimited license costs \$25,000. Tuners are free. Bongo, the development tool for the Castanet Transmitter, sells for \$495. As part of a warming relationship between the two companies, Marimba also has just signed an agreement with the same value-added reseller that Netscape uses and is expected to offer government pricing before the end of the year.

PointCast I-Server 1.2/ PointCast Client

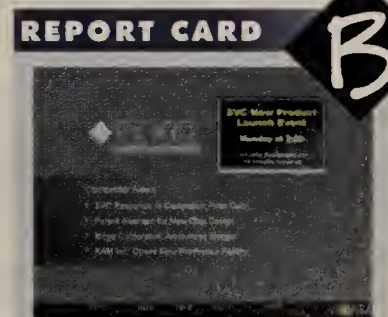
PointCast was the original server-push company. It gets its revenues not from software, but from its ad-based content, so it's less geared toward corporate or government intranet users than toward general Internet consumption. Still, we talked to several satisfied users who are successfully combining PointCast's content with their own corporate channels to disseminate important company information. Overall, we rated it good.

Houston Industries uses PointCast to broadcast human resources information and stories about the effects of competition

and deregulation on the power industry. "It's easy to use and very reliable," said programmer/analyst Bob Bertrand. It also has had several nice side benefits, Bertrand said. "You can hook it up to an Oracle [Corp.] database and create dynamically built charts, which means you don't have to pay for additional Oracle seats just so managers can view the latest information. They can just click on a link and look at it," he added.

The bottom line, according to Kendall Whitehouse of the business school at the University of Pennsylvania, is that "it gives you an approach to come to terms with controlling the information flow in your organization." Whitehouse said his organization uses PointCast to keep students abreast of upcoming events, announcements and deadlines.

Here's how it works: To use PointCast, you must set up a Web server. PointCast caches content at the client and the I-Server and performs some intelligent algorithms — such as load-balancing and thread management — to minimize the load on the network. You can set up different publishing groups that have rights to put articles into different channels.



PointCast I-Server 1.2/ PointCast Client

PointCast Inc.

(408) 253-0894

www.pointcast.com

Price and Availability

PointCast I-Server 1.2 and PointCast Client are available free. A government version is due out soon from BTG that will be available on the GSA schedule.

Remarks

The most popular push product, PointCast takes control over what appears on users' desktops. The software is inexpensive, but it slows down performance of other Internet applications dramatically.

Final Score

Good

Visit our Web site at www.fcw.com/pubs/gbb, where hotlinks to the vendors mentioned here are available for your convenience.



You can, therefore, control who has the rights to publish what, which is one of the few security mechanisms the product adds to whatever security mechanisms you might be using on your Web server. You also can replace the PointCast ad with your own message, and you can do some limited customization of the client look and feel.

PointCast was easy to install, but configuration was tougher than it was with the other products. In particular, it was quite difficult to set up as an intranet-only product because the assumption is that you would buy this product for its broadcast content, even if you wanted to also add your own channels. This makes the product a bad fit for agencies who don't want a connection to the Internet but who do want to push their own content.

Although best known for general-interest content such as CNN, PointCast and its partner BTG Inc. recently created an alpha release of Government Insider, a channel that offers compelling content specifically geared toward the federal government (see sidebar, Page 38).

Perhaps the greatest problem with PointCast is that it's like the old "Outer Limits" intros: PointCast said, "WE control the horizontal, WE control the video." You have to use the client to view transmissions, and we were inexplicably thrust into PointCast screen-saver mode for no good reason, while we were using other programs. When we ran the Netscape browser, at the same time, the PointCast Client and the browser slowed to a crawl. We had to shut the server off to use many other Internet products.

Another complaint: Although you can do some customization of the product, you're essentially stuck with a two-level organization of the user interface, which could conflict with whatever look and feel and navigation you want to give your own content.

Finally, unlike the situation with Marimba channels, you cannot currently broadcast to the entire world without establishing a business relationship with PointCast, although this is expected to change soon.

It also is important to note that although we tested PointCast

I-Server 1.2 and the PointCast Client, PointCast is revamping its product line and drastically changing its pricing structure, breaking up the I-Server into two component parts and making both parts free. The fact that the products will be free, along with the relevant Government Insider content, knocked it up a notch in our evaluation, from what would have been a satisfactory score to a good one.

PointCast's new product line consists of three tools: PointCast Corporate Broadcast Manager, PointCast Caching Manager and PointCast Administrator.

Essentially, PointCast I-Server has been upgraded slightly and split into the first two products. The third product is new.

A company spokesperson says that the PointCast Corporate Broadcast Manager will read a company's current corporate channel and update it to the new format for immediate use by clients running version 2.0 of the PointCast Network. Current PointCast clients will automatically connect to PointCast Caching Manager to obtain external PointCast Channels.

Agencies wishing to control all the content and advertising that is broadcast on the PointCast Network may purchase the PointCast Added Control (AC) client for a tiered-client licensing fee. With this product, you can eliminate sports or entertainment information or anything else you deem inappropriate from being broadcast on users' desktops. The new client is expected to be available for beta testing beginning in late summer.

PointCast AC, in conjunction

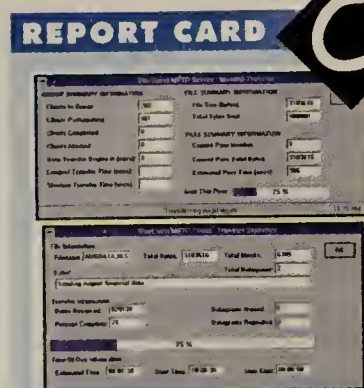
with the new corporate tools, will let agencies create custom configurations of the PointCast Network, including adding multiple dedicated channels and eliminating all advertising from the programming.

PointCast I-Server was available on the General Services Administration schedule for \$950, and ordinary clients were free; however, as this review was going to press, the price on the PointCast I-server was dropped to nothing, and now it is, literally, free. Customized clients are available for a range of products, depending on the number purchased, and they will now be the only PointCast products in the corporate line for which a fee is charged.

Version 2.0 of the PointCast Network and PointCast Studio are free and available today in beta version and can be downloaded at www.pointcast.com. PointCast Corporate Broadcast Manager, PointCast Caching Manager and PointCast Administrator are free and expected to be available for download sometime this summer. A beta version of PointCast Caching Manager will run initially on Windows NT; beta versions for Sun Solaris and HP/UX are due out later this year. PointCast AC is expected to be available in late summer, when pricing will be announced.

StarBurst Multicast Server/Client

StarBurst Multicast Server is a no-frills communications tool. But what the product does, it does well, handling broadcast and multicast channels. We rated it satisfactory overall.



StarBurst Multicast Server/Client

StarBurst Communications Corp.
(800) 585-3889
www.starburstcom.com

Price and Availability

Retail pricing starts at \$39,900 for 25 clients.

Remarks

A no-frills communications offering that handles broadcasting and multicasting, the StarBurst product is on the expensive side and offers few customization tools.

Final Score

Satisfactory

StarBurst can be used in a purely intranet environment (over local- and wide-area networks) or over the Internet. It can transmit binary files, so you can use it to update software as well as editorial content. This means it's really great for system and network administrators, as well as for publishing departments and others wishing to send out departmental messages. It can even handle satellite transmissions, if that's important to you.

We followed the automated

installation procedures, entered some configuration values required by Windows NT, set up host tables on each machine, and it worked.

Pushing content was pretty easy, too, once we correctly configured the host tables on each client machine.

This ease of use is something StarBurst customers clearly value. "What it bought us was the ability to use NT servers instead of buying and maintaining an expensive Unix network," said Harold Schenker, chief executive officer of Campus Interactive, a company that has set up kiosks on numerous college and university campuses to broadcast announcements, entertainment and ads. "It's the only way we could get our large, compressed MPEG audio and video files out without lots of hardware and mainframes," he said.

You have to have NT 3.51 or higher to use StarBurst Multicast Server, but it can push files created on any type of computer, and clients can be running Windows NT, Windows 95 or Mac OS.

Indeed, Schenker says his company's content is created on Macs and pushed to NT machines, which then broadcast content to the LAN-based kiosks, which consist mostly of Macintosh machines. Because the files are usually large and errors can interfere with transmission, he particularly likes the fact that StarBurst breaks up transmissions into small blocks and asks for confirmation that the data was transmitted successfully. If not, it is instantly retransmitted.

"Normally, a 1G file can take an hour to transmit, and if the

data file is corrupted, the machine crashes and the file has to be totally transmitted, but StarBurst doesn't have this problem because they retransmit when the error happens," said Galen Muse, product manager for DigitalXpress, a company that worked with Campus Interactive to develop the kiosks. Muse said the error checking, while it adds about 30 percent to the transmission time, isn't a serious bottleneck. "I'd rather pay the 30 percent penalty than have to retransmit, which doubles the required time, even if you get it on the second try," he reasoned. StarBurst's ease of use has improved the time it takes to make changes to systems and files, and that, in turn, has improved the company's overall time to market, Muse added.

StarBurst is decision-support-system-compatible. Its secondary security mechanism is the ability to set up multiple groups, so you can transmit different information to each group, depending on each one's privileges. You can choose from the following:

- Closed. Files are transferred only to those clients included in the closed groups, up to a maximum number.
- Open limited. Files are transferred to any client that registers to receive the file until the maximum client limit. The server also tracks the identity of each client that registers to receive a file and their identity is entered into a log file, so you can track which client machines have received the file.
- Open unlimited. The same as open limited, except the server doesn't track the identity of the clients.
- Open unacknowledged. Anyone can get the file, and there's no record of file receipt.

Of course, you could encrypt the data before you send it, and StarBurst is compatible with encryption schemes such as Digital Signature Standard.

The negatives of StarBurst, however, are significant. A small nit is that you have to specify the destination file differently on each type of client, using the right sequences of colons, slashes and backslashes, so you have to push differently to different types of machines. A larger criticism is that you get almost nothing in the way of bonuses with StarBurst. You don't get any prepackaged content; StarBurst makes its money selling software, not content or ads. Nor do you get the content customization tools that you get



ON THE HORIZON

Other Push Products

► LISA STAPLETON

It's a measure of how young the server-push field is that many companies are working on new or reintroduced products. For instance, Microsoft Corp. (www.microsoft.com) has said it plans to enter the server-push market and to make its technology compatible with future generations of Netscape Communications Corp. push technology, but a product incorporating the technology is at least six months away, maybe more.

The Internet Company (www.theinternetco.com) opted out of our review because its product is still being written, while Wayfarer Communi-

cations Inc. (www.wayfarer.com), a successful push vendor of Incisa, is redoing its product so thoroughly that the company did not want to be evaluated on the basis of its present technology.

We excluded two other much-discussed products because they were so specialized. BackWeb Technologies' (www.backweb.com) popular BackWeb server product is a hit in industry, where advertising is key. That's because the product has special facilities for creating and presenting animated ads, as well as ways to keep statistics concerning how many people have seen or clicked on an ad.

Intermind Corp. (www.intermind.com) has introduced a server product called Dynamic Publisher and a client viewer, Intermind Communicator, which is probably overkill for many government organizations because it requires that you already have a fairly sophisticated site running off

a database. "You really need to be working with a database-driven Web site to utilize Dynamic Publisher," said Steve Jarvis, an Intermind spokesperson. The company also is working on Dynamic Publisher for Lotus Development Corp.'s Domino, which would connect a server-push system to organizations' current Notes databases, so that users could know when changes have been made to the Notes data. The product is currently in beta format.

Intermind will soon have competition. Data-Channel (www.datachannel.com) is working on a database-driven push product that is expected to be released by late summer. The product would present documents — not just Web documents, but electronic documents and images in a variety of formats — to intranet users.

One thing is clear: The server-push market will be a very different place this time next year.

with PointCasts' I-Server, although you do get some rudimentary administration and logging tools.

The documentation is mediocre, making it tough to learn the few operations you need to know to be an effective user. It takes a lot of experimentation to figure out what the cryptic error messages mean.

And it's expensive: Pricing starts at \$39,900 for 25 clients, which is a killer considering that you could probably set up something that does much of what StarBurst does using file transfer protocol. ◀

Stapleton is a journalist and former programmer living in San Jose, Calif. She is author of the book, The Absolute Beginner's Guide to Unix, and the founding editor of Netscape World. Hart is the director of software development at Data Ace, a Web software and consulting company. Jourin has worked in system and network administration for a variety of companies.

HOW WE TESTED

Push Technology

We installed these products on an NEC Technologies Inc. P2200 running Microsoft Corp.'s Windows NT Server 4.0. Where possible, we also tested the server on an UltraSparc 1 with 64M of RAM and 1G of disk space. One client was always running Windows 95 on an NEC P2200M. Another client ran on a separate NEC P2200 running Windows NT Workstation. Where Macintosh versions of the client were available, we installed the client and evaluated it on a 117 MHz Macintosh PowerBook 5300ce with 32M of RAM and 1G of disk space. It ran System 7.6.1.

We first looked at how easy it was to install and configure each product, giving heavy preference to automatic installation routines, understandable prompts and clear, easy-to-follow directions.

Next, we checked ease of use by creating channels then pushing files from the server to the clients. We looked at how easy it was to customize the look, feel and content that users would see. We also created publishing groups and pushed documents to each group. Where possible, we customized clients to receive different types of content.

To test performance, we looked at the client and the server, checked how much memory and disk space

were used and evaluated whether performance seemed perceptibly slow. We gave points for features that minimized the load on the systems as well as for features that helped these products to be run in the background while other tasks were running. We subtracted points when products interfered with other programs running on our desktops and servers.

We also looked at different types of security mechanisms, such as password protection, document security, authentication and other techniques.

We then evaluated how flexible and appropriate these tools were for different types of government users. For instance, we looked at how appropriate the business model was for most government users, as well as the availability of the client and server on multiple platforms.

We took into account the tool's ability to expand to meet future needs as users and administrators become more sophisticated. The ability to use the tool to publish on an isolated intranet, as well as over the Internet, also was an important criterion.

We also scored extras, such as inexpensive add-ons or relevant content provided. To evaluate prices, we took into account the total price for the server and the clients, using the General Services Administration schedule where available, or a retail price where government pricing wasn't established.

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ACQUISITION ANSWER MAN

Q. As an Army frequent buyer, and adviser to others, of computer systems, I find *GBB* reviews to be helpful, but the problem is *GBB* never seems to review the computer systems found on the standard Army and DOD contracts, such as PC-2 and Portable-2. Why not? It would certainly be helpful to all of us to know how these systems stack up against others.

Bobbie Kerns
USA Topographic Engineering Center
Alexandria, Va.

A. It's true that we tend to review systems shipping on the GSA schedule rather than those available on indefinite-delivery, indefinite-quantity contracts. The reason is that we always conduct apples-to-apples comparisons, and that's hard to do across agency contracts.

We ask PC manufacturers to send us a particular configuration, including processor speed, amount of memory, hard drive size, CD-ROM speed, monitor size, etc. Often, that exact configuration is not available on an IDIQ vehicle, although vendors usually can supply us with the appropriate system off their schedule contracts.

However, IDIQ contracts frequently offer similar configurations to the ones we end up reviewing. Buyers interested in purchasing products off an IDIQ vehicle should look at our Contenders box, which lists the

IDIQ vehicles that offer each product.

We are very interested in conducting more reviews of systems shipping on major IDIQ contracts. And you, readers, can help us do that. We occasionally have trouble convincing prime contractors to let us evaluate the systems they offer on their IDIQ vehicles. Sysorex's PC-2 system is a case in point. We'd love it if you would put pressure on your suppliers to send their systems out to our test center for review. Let them know that you don't want to buy a machine until it has been through the rigors of the FCW Test Center evaluation process.

Q. I am interested in knowing if you have performed a review of virus-detection software, particularly McAfee Netshield vs. IBM AntiVirus.

Doni Caldwell
Atlantic Fleet ILO Activity
St. Juliens Creek Annex
Portsmouth, Va.

A. The last time we did a major comparison of anti-virus products was in May 1995. However, keep an eye on our First Looks section during the next few months because our reviewer (and anti-virus expert) Earl Greer will look at IBM AntiVirus and Dr Solomon's Anti-Virus Toolkit.

For now, Mr. Greer responds: McAfee Associates Inc.'s NetShield (www.mcafee.com) has versions available

for Novell NetWare and Windows NT. IBM's AntiVirus (www.av.ibm.com), by contrast, comes in Windows 95 workstation and network editions.

The McAfee and IBM products have good detection and disinfection. They also have good management features and will give about the same level of security. I suggest choosing between them on the basis of price and any special features that are important to your agency. I have a slight personal preference toward the McAfee product, as it has a less cumbersome user interface. But if you support OS/2, you may want to choose IBM's package. Another package I like is Dr Solomon's Anti-Virus Toolkit (www.drsolomon.com).

Most organizations should purchase two different anti-virus products, one as a site license and the other in individual copies for trouble-shooters to use.

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Does your agency or workgroup provide remote access for personnel on the road or working from home?



"Yes, we do constantly. We use cc:Mail Mobile and a mixture of computers that can dial in to our LAN."

— Glenda Bluhm, a computer specialist with the Defense Logistics Agency, said her agency has people working on the road and away from the office constantly, so remote access is very important to their work.



"Yes, we do. We dial in to NASA using 28.8 kilobit/sec fax/modems."

— John Bruce, an MIS support specialist with NASA, said his agency's notebook computers are equipped with PC Card modems that enable employees on the road or at home to dial in to servers at NASA.



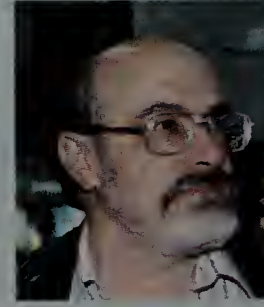
"Yes, we do. We use a variety of methods — everything from ISDN [and] analog modems to [the International Maritime Satellite Organization]."

— Dale Edgeington, coordinator for capacity planning at the Navy, said his agency depends greatly on remote connectivity and uses a variety of hardware and software.



"We are working on a new system that involves a product from Ascend that we connect directly to our LAN over ISDN or over regular analog."

— Eric Johnson, a LAN manager with the Washington, D.C., Fire Department's EMS Bureau, said remote access is very important in his line of work.



"No, we don't. We work primarily out of Washington and hardly go on the road at all."

— Carl Mintz, of the House Banking Committee, said Congress has yet to fully embrace the benefits of technology, adding that his workgroup does not have a requirement for remote access.



"We do have some people that work from home who dial in to our network using laptop computers equipped with modems."

— Michelle Spier, a technical writer with the Justice Department, said DOJ employees use docking stations that enable them to take their systems on the road and dial in via built-in modems.

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Extranets

Giving intranets 'extra' flavor

*By Denise Pappalardo***AN EXTRANET CHECKLIST**

Before drawing up a contract with your favorite Internet service provider to support your extranet, make sure you get the following items in writing. Analysts recommend that if an ISP is reluctant or blatantly refuses to put even one of the following in your contract, find another ISP.

- ✓ How the ISP will keep your information secure.
- ✓ Guaranteed latency throughout the network.
- ✓ Network uptime.
- ✓ Dial-in port availability for your partners, customers and your own mobile work force.
- ✓ Compensation if the above conditions are not met.

Get more info online:

- An overview of a large extranet that links manufacturing corporations, government agencies and research labs
- A guide to building an extranet
- A look at Netscape's extranet strategy



Are you interested in building better relations with your customers, promoting collaboration among multiple parties or simply staying ahead of the competition? If so, setting up an extranet may be the way to go.

Let's eliminate any confusion as to what constitutes an extranet. An extranet is a selective extension of an intranet, which is a private IP network. Selective access is granted to a controlled group of customers and business partners.

Only a handful of Internet service providers have a branded extranet service today. But just about every other national ISP has a strategy for how to let their customers open up their intranets. Or users can take the extranet in-house simply using their ISP for access.

As businesses expand, mobile work forces grow and competition closes in like a noose around your neck, taking advantage of IP networking is becoming a key planning tool.

We talked to three users in three markets — architectural, automotive and health care — that have already committed to taking the extranet plunge. Each approach is as different as their industries, but the common goal of keeping people in touch with vital information rings through all three cases.

Gensler, one of the largest architectural and design companies in the country, is testing the extranet idea. Gensler has about 1,200 employees at its San Francisco headquarters and about 400 more spread out around the world.

"Virtual private networking is really important to a company like Gensler because we have folks in construction trailers around the country," says Bruce Bartolf, vice president of information systems at Gensler.

Gensler's intranet includes human resources information, electronic time cards for billing and collaboration tools for designers, Bartolf says.

Gensler is testing Pilot Network Services, Inc.'s Secure Road Warrior as a way of letting its mobile work force access the corporate intranet, Bartolf says. The service lets remote users establish an encrypted IP tunnel to any one of Pilot's network service centers around the country (NW, May 26, page 29). The IP tunnel is encrypted using 128-bit key encryption. Users' information is decrypted and authenticated at the network service center. Users then are passed on to their corporate intranet, which is connected to Pilot via a dedicated T-1 connection.

Other ISPs, including Concentric Network Corp., BBN Planet and UUNET Technologies, support secure remote access for dial-in users.

BBN Planet recently introduced the latest version of its managed firewall service, Site Patrol 3.0 (NW, May 5, page 28). This service supports dedicated, secure Internet access using 56-bit key

encryption security. UUNET's ExtraLink Remote service, announced nearly seven months ago, also supports dial-in users, but the service still isn't commercially available. This service, like BBN's, offers users a managed firewall in addition to an encrypted IP tunnel.

Extranet or autonet?

Chrysler Corp. set up its extranet to keep its 20,000 suppliers around the country informed.

Chrysler's extranet, called the Chrysler Corp. Supply Partner Information Network (SPIN), lets dealers, distributors and suppliers access the Auburn Hills, Mich.-based automotive company through the Internet. Chrysler has a dedicated T-3 (45M bit/sec) Internet connection from MCI Communications Corp. that hooks up to its IBM firewalls, says John Kay, manager of electronic commerce at Chrysler.

Since October, the network has given business partners access to critical information such as product shortages, purchase orders, warranty documents, supply report cards and rates. "This is our way of communicating with the external world on a real-time basis," Kay says. "The network lets us eliminate a lot of middleman activity that we've done in the past, and it also helps us have great access to our supplier audience."

Previously, Chrysler would send mailings to its suppliers, but the mailings didn't reach everyone, he says.

With the new system, 3,000 suppliers have direct

access to Chrysler today and 12,000 will be online by the end of 1998, he says. The network uses Secure Sockets Layer security with user IDs and passwords, Kay says. But Chrysler also is looking into digital certificates as a way to enhance security, he says.

Chrysler manages SPIN in-house but designed it with the help of IBM and MCI.

The handoff

Unlike Chrysler, VHA, Inc., a health care provider consortium, handed over extranet management and design efforts to its ISP.

In August, VHA plans on launching its extranet, called VHAsecure.net, with the help of IBM Global Services. Initially connecting 60 hospitals, the network will eventually link 1,200 hospitals, doctors and pharmacists around the country (NW, April 21, page 21).

"We could not have done this without IBM," says Lynn Gentry, news and information manager at VHA in Irving, Texas. "This network is too big of a task; we couldn't possibly have staffed up for this."

The company has dedicated permanent virtual circuits on the frame relay portion of IBM's Internet backbone to support VHA's extranet. IBM also is managing VHA's firewalls and routers.

The real benefit in setting up VHAsecure.net is "that it will let us build up the communication, collaboration, connection and commerce between all of VHA's partners," Gentry says. Internally, VHA calls this the four "C"s, he says.

VHA's extranet will offer a large consortium of health care providers a unified way of communicating, Gentry says. Now VHA partners will be able to send information back and forth without worrying about having the right software or hardware, he says.

IBM also has guaranteed VHA port availability and network uptime, which is one of the key reasons why it chose IBM Global Services for the project, Gentry says.

To each his own

Establishing an extranet may initially seem difficult for users because it's not a cookie-cutter type service.

For VHA, the best solution was to work closely with its ISP to set up and manage its extranet project. For Chrysler, it was better to keep management and security internal. Gensler falls in between, using Pilot to authenticate users, but setting up a separate extranet for some specific clients in-house.

Your ISP can help you get started or take the project from its infancy to completion. Or users can do all of the work in-house and simply use their ISP for dedicated Internet access. It's entirely up to you. ■

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Intranet Applications

Covering: Messaging • Groupware • Databases •
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Briefs

■ **Vienna-based Creditanstalt Investment Bank** has selected **TimeStep Corp.'s** IPsec-based PERMIT product to secure elec-



tronic transfer of orders among 16 bank

branches on Creditanstalt's IP-based backbone network.

The TimeStep device encrypts IP packets.

■ **Vancouver-based Xcert Software, Inc.** has started shipping Sentry CA 1.2, a Unix-based certificate authority management software product that lets organizations sign and manage Pretty Good Privacy keys and X.509 digital certificates.

In addition, Xcert last week released a beta version based on NT.

© Xcert: (604) 640-6211

■ **Axent Technologies, Inc.** has released a Solaris version of its **OmniGuard/Defender Security Server**, token-based server software used to prevent unauthorized network access. Pricing starts at \$1,995.

Axent also said CyberGuard Corp. has integrated Axent's challenge/response authentication technology, called the Defender Security System, into the CyberGuard Firewall 3.1.

© Axent: (301) 670-3653

■ **Edify Corp.** has begun shipping an updated version of its **Electronic Banking System (EBS)** software that gives banks a way to offer services on the World Wide Web.

With EBS 1.5, banks get added features that include "Headline Pages," individualized customer Web pages that combine transaction services with individual news or reminders, as well as targeted sales messages.

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Java applets attack Mars!

Internet users can explore planet using same applet as Jet Propulsion Lab scientists.

By Carol Sliwa
Pasadena, Calif.

Java may not have reached Mars yet, but an applet created with the programming language is helping earthlings explore the planet from desktop machines running Web browsers.

The Java applet, called the Web Interface for Telescience (WITS), lets Internet users plan and execute their own simulated rover mission over the Martian landscape, sort of like steering a toy car through an obstacle course in a video game.

But the pictures and data they are viewing on the World Wide Web are not some programmer's computer-generated fantasy. They are the actual images transmitted 119 million miles back to Earth from the Pathfinder landing craft and the microwave oven-sized Sojourner roving vehicle that reached Mars on July 4.

Scientists at mission control, the Jet Propulsion Lab here, use the same Java applet to measure

rocks and store information about their composition. But the scientists access the Java tool through a different URL, which links them to a protected Web site behind a firewall.

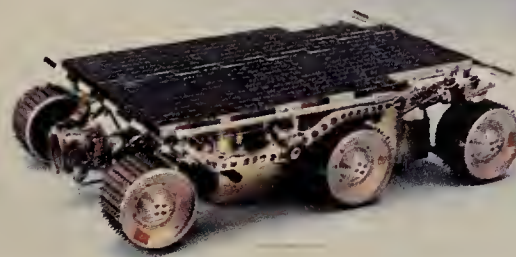
Why use Java to build the applet? According to a Jet Propulsion Lab official, the technology is attractive because it can be used to build applets accessible to users with popular Web browsers, regardless of where the users reside or what desktop computer they are using. And Java can be used to build interactive applets that are fun, educational and useful at the same time.

The applet can be downloaded from Web sites sponsored by Sun Microsystems, Inc. and others. One address is <http://mars.graham.com/wits/>.

Looking ahead, program developers have far bigger plans for the WITS Java applet. They want to let scientists from all over the world collaborate on command sequences for the rover.

The current Pathfinder mission is not expected to last more

than a month, so all the scientists can work on the project here. But the next mission in 2001 is expected to run for a year, and



The Sojourner roving vehicle that reached Mars.

the Jet Propulsion Lab needed to find a way to let scientists participate from their home institutions.

"I started this right when the beta release of Java was available. It sounded like the right thing, so we tested it out and [realized] it was obviously the way to go," said Paul Backes, a technical group leader at the Jet Propulsion Lab who helped create the Java applet.

The group wanted scientists to be able to use the tool in a dis-

tributed way over the Internet, so they could work together to determine where they wanted the rover to go and what they wanted it to do.

"Everyone can be using WITS at the same time and see what each other wants to do. They'll collaborate to decide on a daily mission plan," Backes said.

Java's platform independence was a key selling point because Backes' group did not want to dictate which operating system scientists would have to use.

Another added benefit has been the reduced development time. Backes estimated his development work would have taken four times longer with C or C++.

Backes also likes the object-oriented nature of Java and the fact that the graphical user interface is part of the language.

But the real advantage is ease of deployment.

"Here, the deployment is trivial," Backes said. "It's not even a part of the process anymore because it's just a URL, and [scientists can] just deploy it themselves without any effort using their own computers." ■

SoftArc plugs its groupware into the 'Net

By Paul McNamara
Markham, Ontario

SoftArc, Inc. has become the latest groupware vendor to pledge allegiance to the Internet with its release last week of FirstClass Intranet Server.

Based on core technology within SoftArc's flagship FirstClass 3.5 messaging server, the intranet version is a new product with a new pricing scheme and support for a passel of Internet standards.

Users and analysts said the package will allow SoftArc to satisfy its installed base and compete with groupware powerhouses such as Lotus Development Corp.'s Notes/Domino and Microsoft Corp.'s Exchange in the small- to midsize-business market.

FirstClass Intranet Server runs on a Windows NT or Macin-

tosh operating system and supports Internet standards Post Office Protocol 3 (POP3), HTTP/HTML, Simple Mail Transfer Protocol, Network News Transport Protocol, Multipurpose Internet Mail Extensions and Finger. Features in-

clude e-mail, replicable discussion databases, forms processing and Web publishing.

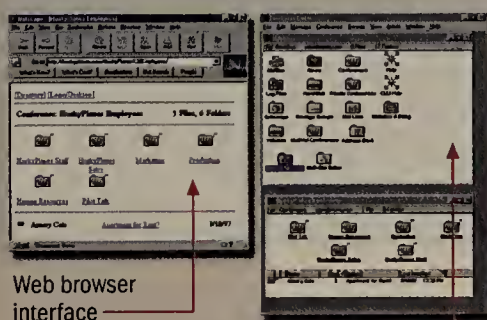
One customer who installed the intranet version three weeks ago sees the product as a major step forward for SoftArc.

"I have been incredibly impressed with the difference between this and the previous product," said Sean Murphy, project director at Emory University in Atlanta. "When I did the upgrade to the new server, I noticed an approximate tenfold speed increase that was entirely code-related."

Intranet Server includes a more customizable user interface and enhanced e-mail sorting capabilities, he said.

Two ways to view

Users can view files and folders on SoftArc's new FirstClass Intranet Server via a Web browser or FirstClass client software.



However, Murphy said, "The base functionality of the Internet services is not perfect; it needs to be a little bit fancier."

The server can be accessed via the new FirstClass Intranet Server Client, an existing FirstClass client, Web browser or any POP3-compliant client.

FirstClass Intranet Server costs \$999 per server, which includes a 10-user license. The price also includes two concurrent session licenses, which allow an unlimited number of end users to access the server — one at a time — at no extra charge. Additional user licenses are available in lots of five, 10, 25, 50, 100 and 250 for prices ranging from \$35 to \$70 per license. Extra concurrent licenses costs \$399 each.

Existing FirstClass customers may upgrade to the intranet version for \$299 over the next 90 days, after which the upgrade price will increase to \$599.

© SoftArc: (905) 415-7000

Contigo upgrades tool for guided Web tours

Company pitches the Internet as ideal for conducting sales and training presentations.

By Ellen Messmer
San Diego

Contigo Software, Inc. today unveiled Itinerary Web Presenter 2.0, the latest version of its Java-based software for conducting training and sales presentations over the World Wide Web.

Contigo's Itinerary lets a designated Web "pilot" take any number of users with Java-enabled browsers as "passengers" on a guided Web tour. The new version includes a way to present Microsoft Corp.'s PowerPoint and Corel Corp.'s Presenter 8 slides as part of the trip, too.

To get started, passengers download the Contigo client software in the form of

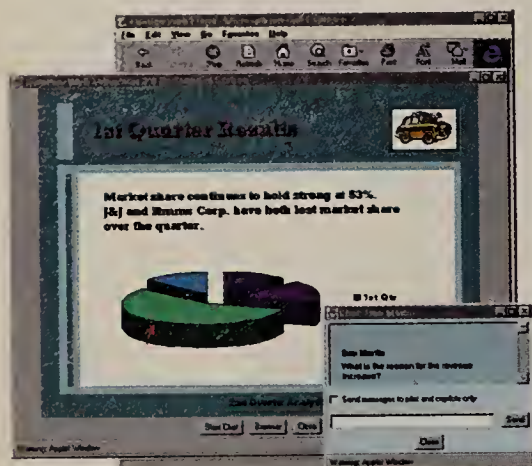
whiteboard form on the Web slides. The whiteboard is a function popular in the International Telecommunication

Union's T.120 data-conferencing standard, but Itinerary does not conform to T.120.

Contigo President Tom Daniel said that while T.120 provides a feature-rich standard useful for full-video presentations, it is not central to Web-centric applications.

Itinerary Web Presenter 2.0 starts at \$195 for a five-user server software package.

© Contigo: (619) 278-5900



Contigo's Web Presenter 2.0 lets you take any number of "passengers" on a guided tour of the Web and PowerPoint and Corel slides.

a Java applet from the Contigo server, which can reside on any server running the Java Virtual Machine. The individual making the presentation — dubbed the pilot — can take the passengers on a flight to view Web pages anywhere on the 'Net.

When using presentation software output, Itinerary server software filters out presenter notes so only the pilot sees them through a prepared window.

Itinerary 2.0 also has added a chat system for discussion between the passengers and pilot, said Dan Martin, Contigo product marketing manager.

But Contigo users are more likely to use the telephone for the audio portion of the presentation, he added. Users typically discuss the presentation over the phone while viewing the contents via computer over an intranet or the Internet.

The user view

Menlo Park, Calif.-based Versant Object Technology, Inc. has been using Itinerary for seminars and the delivery of sales presentations to prospective customers. "We use Contigo Itinerary for demonstrating PowerPoint presentations we used to give on-site during our first visit to a potential customer," said Amy Monson, Versant sales representative. "Now we can do the presentation over the Internet to several groups at once. It's a time-saver."

The latest version of Contigo software has a way for the pilot to make notations in

SIEMENS

Before you buy another phone, check



Start-up adds zip to Web-based transactions

By Kristi Essick
Cambridge, England

Start-up nCipher Corp., based here, this week plans to announce a product that it claims can dramatically speed up the number of encrypted trans-

actions a Web server can process per second.

The product, dubbed nFast, is an accelerator card that takes up a 3.5-inch disk drive slot on a Web server and boosts server performance of secure transactions.

Most Web servers slow down when processing the large amounts of arithmetic information associated with secure transaction protocols, according to nCipher officials. The new product aims to fix this by off-loading the arithmetic processes to

several high-speed cryptographic Reduced Instruction Set Computing (RISC) chips on the card.

The nFast product accelerates a variety of security protocols, including Secure Sockets Layer 2 and 3 and Secure Electronic Transactions.

The product is aimed at any company operating an electronic commerce Web site. By speeding up the number of key signings per second, nFast prevents end users from experiencing delays while they wait for their transactions to be completed, whether they are buying something on the Web or completing another encrypted transaction, according to nCipher.

The RISC chip design in nFast comes from Acorn RISC Technology, also based here. However, Digital Equipment Corp. will build the RISC processors for the nFast card, an nCipher spokeswoman said.

The company plans to offer various configurations of nFast, with the top-of-the-line accelerator boosting the number of 1,024-bit RSA digital key signings per second to nearly 300. Customers can group up to seven cards, boosting processing speeds to almost 2,100 key signings per second. By contrast, high-end Web servers based on 166-MHz Pentium chips can process only about 15 secure transactions per second, according to nCipher.

The nCipher product will work with any server that has a SCSI port, including those running Windows NT Server.

The nFast product line will be available starting Sept. 9. Pricing has not been announced.

© For more information, contact nCipher at (508) 691-6487.

Essick is a correspondent with IDG News Service's London bureau.

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The Future Is Coming To Us.

Lotus strengthens Domino security

By Ed Golden
Cambridge, Mass.

Lotus Development Corp. has said that in response to customer requests, it will begin integrating public-key technology from Entrust Technologies, Inc. into its Domino server software.

The move will let administrators choose between Domino's integrated public-key infrastructure and Entrust PKI software, said Kevin Lynch, product manager for Notes and Domino security. Administrators will need to handle only one set of keys no matter what application is involved, he said.

Lotus will introduce Entrust's security technology in four stages.

Domino 4.6 will be able to authenticate clients whose keys were signed by Entrust's WebCA, a certificate authority management server for issuing public-key digital certificates for Web browsers. Dom-

See Domino, page 36

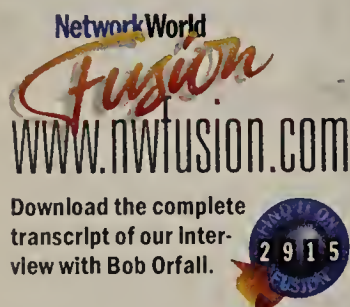
CORBA on the brain

Object expert Bob Orfali explains what this increasingly prevalent object technology means to network managers.

QA Bob Orfali wrote the book — actually several of them — on Common Object Request Broker Architecture (CORBA). But not only has he coauthored books such as *Client/Server Programming with Java and CORBA* and *Instant CORBA*, he also is director of the CORBA/Java Lab and Graduate Program at San Jose State University and a consultant with IBM. So who better to ask about what network managers need to know about CORBA and other object-oriented technologies? *Network World* Senior Writer Carol Sliwa recently did just that.

On network and systems management:

The combination of CORBA and Java has the potential of revolutionizing the way we do systems management. Network managers should understand that the network devices are getting smarter, routers are containing more information. The more things that are deployed on the 'Net, the more information we need to keep it up and running.



Domino

Continued from page 35

ino 4.6 is due to be released in the third quarter, but a prerelease version is available now on Lotus' Web site (www.notes.net/46/).

Next, Notes clients will be able to send and receive signed and encrypted mail using Secure Multi-purpose Internet Mail Extensions with other S/MIME-aware messaging clients. Support for S/MIME will become available in Domino and

So the combination of CORBA and Java gives us the most intelligent infrastructure we can think of to do this management.

Java is important because it's a nice way to do agents for system management. It's almost the perfect replacement for SNMP, which today is too primitive to do this kind of system management... SNMP relies on polling and doesn't scale. What you really need is an object that has enough intelligence to be able to react to a set of commands that are polymorphic, meaning

you send the same command to different objects and, depending on what device they're monitoring, they will react differently.

We have this capability of shipping agents in JARs [Java Archive files], and then these Java agents communicate back using CORBA. So whether the system management console is OpenView, SystemView, Tivoli or Solstice, the console can receive stuff from those agents.

On network bandwidth:

The thing about objects is that they tend to mimic real-life objects. People tend to use real-life metaphors similar to objects. So in the beginning, objects start off with GUIs, and pretty soon they're [represented by] little icons, and [then] they're going to move to virtual reality. Users want the object to look like the real-life object. So obviously [the objects are] going to use a lot of

bandwidth.

But the nice thing about objects is that they allow you to partition the bandwidth in ways that make more sense because they're so like Legos. So if you find out that two objects require tons of bandwidth, put them in a place where there's a big pipe between them. And if you want to distribute them through your browser, then make sure they're very thin objects that don't eat up too much bandwidth.

On application development:

[Objects] can be reassembled in different configurations. [This gives] you, as a network manager, a lot more flexibility on how to run your applications. If I give you one big [database]... you need a megacenter to run it. [With objects you can] partition that [database] into 10 little things, and we'll put 'em on 10 different machines. Or we'll put different things on the same machine. We have ways of partitioning the load. And then it means that you have a lot more control over things.

On what's holding back CORBA:

It's an elitist type of environment where high-browed object people, Unix types, were involved in it too much. People like Netscape [Communications Corp.] are a breath of fresh air because they are making it easy to just drag and drop business objects.

Of course, there are things that are left unresolved. But the nice thing about objects is they're incremental. Right now, we have the ORBs [object request brokers]. We're still working on the firewall problems. We're working on administration. We're working on scripting. We're working on system management of object tools. This infrastructure is going to take us into the millennium. So we're building the foundation now. ■

Notes clients in the first quarter of 1998.

Also in the first half of next year, Domino will support more encryption and signature algorithms — DES, CAST, Triple-DES, MD5 and SHA-1 — and will have access to Entrust's certificate management capabilities.

In the second half of next year, Domino will use the Entrust engine to sign and encrypt information, extending Domino users' choice beyond the RC2 and RSA signature encryption algorithms. At this point, customers will have a single point of

administration in the public-key infrastructure for credentials such as Entrust key pairs, Notes IDs and certificates, Lotus says.

Lotus is the latest company to use Entrust technology, said Shauna White, director of marketing communications for Entrust. Other firms using the technology include Hewlett-Packard Co. and Netscape Communications Corp.

For more information, contact Lotus at (617) 577-8500.

Golden is a correspondent in IDG News Service's Boston bureau.

'NET INSIDER

Reflections on Independence Day

It sure has been an interesting few weeks in Internet land.

First, on June 20, a judge in Georgia ruled that anonymous speech on the Internet is protected by the U.S. Constitution. Then, on the same day, a New York judge ruled that it is unconstitutional for a state to regulate content on the Internet if that content crosses state lines. Of course, the big decision came on June 26, when the U.S. Supreme



Scott Bradner

Court unanimously upheld the opinion of the three-judge Pennsylvania court that the Communications Decency Act (CDA) was unconstitutional. Finally, on July 1, the Clinton administration published a revised version of its "A Framework for Global Electronic Commerce." (More about this next week.) All of these developments are very good news for the Internet and its users. There are still a few dark clouds around, but these past few weeks make this a far better Independence Day than it might have been otherwise.

The Georgia case (www.aclu.org/court/aclugavmiller.html) is not quite as clear a beacon as it might be because it was finally decided on the vagueness of the text of the law instead of the principle. The law was attempting to ensure that people were not misrepresenting themselves in Internet communications to commit fraud — for example, claiming to be from IBM when they actually had no association with IBM.

But in the opinion, Judge Marvin Shoob points out that because of the vague text, the law could be read as disallowing the use of aliases or nicknames by individuals who had no fraudulent intent. The judge felt this would violate the Constitution as did the ban on anonymous political speech that the Supreme Court overturned in 1995.

The New York case (www.aclu.org/court/nycdadec.html) is potentially very important in light of repeated attempts by state legislatures to undertake regulation of the Internet in one way or another. The Constitu-

tion prohibits the states from making regulations that inhibit interstate commerce. Judge Loretta Preska ruled that New York's attempt to regulate Internet content did just that and thus was unconstitutional. The judge notes that the jurisdictions of states are based on geography, which is a virtually meaningless construct on the Internet. One could note that this also applies at the national level.

Because I was among those who testified for the American Library Association in opposition to the CDA, the Supreme Court decision in the case (www.ciec.org/SC_appeal/decision.html) is particularly rewarding. The court unanimously found that this law unconstitutionally restricted the free speech of adults and was far too vague and open-ended in its restrictions. (Two of the justices agreed that the CDA was unconstitutional but disagreed with another part of the ruling.) Even President Clinton has reluctantly accepted the decision and is calling for investigation of V-Chip-like solutions to permit parents to control what their kids see via the 'Net.

It has been a beautiful Independence Day and weekend here in Boston. (The rain even cooperated and only fell at night.) With the good weather and the good news on the judicial front, it has been one of the best Independence Days I can remember, and for now I will ignore the ominous clouds in the distance.

Clouds such as Germany setting up cybercops to watch the 'Net and who just might pull you aside during a stopover in Frankfurt if they don't like what they read or see.

Disclaimer: Harvard had Independence Day off (a respite in the relentless pursuit of excellence), so I had to rely on my own opinions.

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Technology Update

Covering: Evolving Technologies and Standards

NUTTER'S NETWORK HELP DESK

Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 476, or send your questions to rnutter@world.std.com.

You recently advised a LAN administrator to use Novell, Inc.'s CONLOG.NLM to log messages displayed on the file server console screen (NW, April 28, page 45). But where do you insert this line? I've tried putting it in various places in AUTOEXEC.NCF and STARTUP.NCF to no avail.

I want to capture error messages that scroll through the console as my NetWare 3.12 server starts up. The messages pass so quickly I can't read them. The server, however, seems to work fine.

Via the Internet

I normally load CONLOG.NLM from AUTOEXEC.NCF. The load statement should directly follow the statement that sets the IPX internal network number. You'll also need a few additional support modules, such as AFTER311.NLM, to get CONLOG to work.

If you're using chained NetWare Loadable Modules, you may have NLMs still loading when the processing of the AUTOEXEC.NCF reaches the end of the file where the UNLOAD CONLOG statement resides. Cheyenne Software, Inc. offers a delay utility called DELAY.NLM that allows you to "stuff" key-strokes into the server's keyboard buffer for execution "N" seconds in the future.

I use this to delay the unloading of CONLOG.NLM for several minutes from when the statement is present in the AUTOEXEC.NCF file. The syntax is: LOAD DELAY 30 "UNLOAD CONLOG." This example indicates that the server won't execute the UNLOAD CONLOG statement until 30 seconds after the server processes the load delay command string.

You'll need support modules such as AFTER311.NLM in the DOS boot directory on the server's primary hard drive, and you'll have to specify an alternate directory for placement of the CONSOLE.LOG file. To solve the error message problem, you probably need to upgrade the version of CLIB in use on the server.

Silicon acceleration boosts Fast LAN management

Well-placed silicon helps LAN administrators manage performance, applications.

By Yancy Lind

High-speed LAN technologies have emerged and flourished in unprecedented fashion over the past five years.

Switched Ethernet, Fast Ethernet, FDDI, and ATM all have changed the way LANs are deployed. And the race for speed is far from over with newer, faster entries such as Gigabit Ethernet poised to enter the market.

CHALLENGES IN HIGH-SPEED LAN MANAGEMENT

Key demands of high-speed LAN environments:

- Coping with higher data volumes and transmission speeds
- Providing higher LAN availability
- Providing higher quality of service
- Keeping pace with growth
- Supporting new applications, such as IP Multicasting

New LAN management systems should:

- Provide an early warning system for detecting potential problems
- Enhance network performance
- Help determine optimal device placements in a switched LAN
- Provide trending information for planning and forecasting resource bottlenecks
- Determine application flows across the LAN for more accurate planning
- Understand the behavior of different network applications
- Enhance response-time monitoring for tracking key application performance

SOURCE: MCCONNELL CONSULTING, INC., BOULDER, COLO.

Unfortunately for users of these Fast LAN technologies, management tools have not kept pace with deployment. Today's LAN management devices were designed to operate in yesterday's shared and low-speed networks.

Management products largely have failed to scale performance up to meet the needs of Fast LANs and failed to scale prices down to meet the burgeoning market demand.

Fortunately, there's a new class of management products emerging to address the needs of Fast LANs. The products are based on custom LAN manage-

ment chipsets that provide a previously unavailable combination of high performance, low price and broad functionality.

While many vendors in the management marketplace attempt to solve performance problems by employing ever-faster CPUs, it is now clear that this approach has serious limitations.

A simple analogy can be made with the evolution of data forwarding devices. In the past, Complex Instruction Set Computing-based bridges and routers have been replaced by Reduced Instruction Set Computing-based routers and switches, only to be replaced again by Application Specific Integrated Circuit- and Field Programmable Gate Array-based devices.

The LAN management industry is about to learn what the LAN forwarding industry already knows: There is no substitute for a few well-designed, well-placed pieces of custom silicon.

The current generation of analyzers and probes are plagued by functionality and ease-of-use shortcomings as well. The CPU in a typical analyzer is overtasked: It must examine every packet that appears on the network, perform a cursory decode to update counters, execute a filtering algorithm that will discard or save the packet, update the local display, perform high-layer protocol analysis and respond to operator requests.

With the CPU overwhelmed with these basic tasks, few cycles remain for "frills" such as an intuitive graphical user interface (GUI) or increasingly complex features such as application tracking and virtual LAN management.

In fact, some high-end systems remain DOS-based precisely because their archi-

Get more on Fusion:

- Consultant John McConnell's white paper on avoiding LAN management black holes
- Background information on Fast LAN management vendor Shomiti Systems



itectures cannot support the overhead of Windows.

Custom silicon can dramatically increase performance while driving down costs and driving up functionality.

Custom silicon offloads the host CPU, freeing it to run a graphical operating system and execute advanced applications with modern GUIs.

For the first time, these high-speed management devices actually can become easy-to-use, intuitive aids for Fast LAN management.

Silicon-enabled packet capture, filter, analysis, counter and transmit functions deliver a new level of performance and functionality to Fast and legacy LANs. Line-rate performance means all packets on a LAN can be analyzed, assuring the troubleshooter full visibility into the problem at hand as well as providing network managers with a true picture of the status and health of their high-speed links.

Line-rate performance also means full-duplex connections may be monitored, providing visibility for the first time into these increasingly popular segments.

User-programmable, silicon-enabled filtering also will provide a new level of functionality, answering questions about the makeup and characteristics of networks above the media access control layer.

For the first time, network managers may decide to capture and examine all SNMP packets or only certain database packets. They may monitor all Web traffic going through a particular gateway or they may look at traffic in a certain VLAN or only particular error packets. And they will do

this all via a simple point-and-click, intuitive GUI.

Analyzers and probes also have been greatly hampered in their acceptance by cost. Few managers can afford, much less widely deploy, the \$20,000 cost for visibility into a half-duplex Fast Ethernet segment. Management products based on custom silicon provide superior performance at significantly lower prices — prices that will decline as volumes rise.

The key to designing a modern analyzer or probe is to understand the right mix of silicon and CPU-based functionality appropriate for the device. Silicon can be designed for line-speed packet capture, filter, basic analysis, counter and transmit functions, handing off noncritical functions such as higher layer analysis, charting and user-interface functions to a CPU.

As LAN data rates continue to rise, watch for silicon-assisted management products to fill the void with a balance of high-performance custom silicon, affordable CPUs and feature-rich software.

These next-generation management devices will come in a variety of form factors, from embedded systems in PCs, workstations and switches to stand-alone boxes that may be accessed and controlled remotely.

Whether embedded or stand-alone, the next generation of "silicon-assisted" network management products is imminent.

Lind is vice president of marketing at Shomiti Systems, Inc., a maker of silicon-assisted Fast LAN management products.

Need information?

Let Network World provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Michael Cooney by phone at (508) 875-6400 or e-mail at michael_cooney@nww.com.



An ambitious proposal for IBM's network division

Around the time 3Com announced plans to buy U.S. Robotics, I began wondering how big a factor size would be in the future success of network vendors. My question was prompted by the growing revenue gap between 3Com and Cisco and the other members of the so-called Big Four in internetworking: Cabletron and Bay Networks.

Usually, analysts and CEOs I queried said something to the effect of: "If size were a factor, IBM would be the leading network company."

While IBM's Networking Hardware Division brings in at least as much revenue as the \$5+ billion 3Com or Cisco, it doesn't have the market muscle or visibility of either. (It's difficult to pin down NHD's revenue because IBM doesn't release figures, and estimates vary.)

NHD seems to be the division CEO Lou Gerstner forgot. He's revived IBM's software business with the purchases of Lotus and Tivoli and has made network computing a centerpiece of his mission. But NHD languishes without a clear (to customers) strategy.

That's because NHD is serving two masters. It must support its huge base of SNA customers. Analysts say sales of SNA products still account for the bulk of NHD's revenue. But NHD also competes with the Ciscos and 3Coms in providing non-SNA — read IP-centric — products.

That makes it difficult for NHD to keep up with the pacesetters. Worse, IBM's past efforts to establish new agendas for the market — for

example, APPN, low-speed ATM to the desktop — have floundered, making it more difficult to win over buyers.

NHD has strong products, some of them top performers in their categories. But with Cisco attacking its SNA base, Gigabit Ethernet weakening the case for ATM and the token-ring market fading, IBM has to find a way to recharge NHD's network strategy.

How? IBM should spin off its SNA products to an independent company, like AT&T did with its equipment arm, now called Lucent. IBM took this tack before, spinning off its printer business into Lexmark.

The new company, ideally owned and led by current NHD executives, would live and breathe SNA networking, helping current customers extend the life of their investments. IBM's NHD would be free to focus solely on IP networking in an Internet, intranet and electronic commerce world.

Skeptics will say SNA is too important to IBM, and the revenue at stake is too great to risk. But SNA is evaporating, and IBM has to decide how to best capture whatever dollars remain. IBM could get a big, one-time gain from spinning off an SNA company and investing that money in new NHD offerings. Or IBM can take its revenue over the next decade by continuing to milk the customer base. By doing that, NHD may pay a big price.

John Gallant, editor in chief

jgallant@nww.com

I n t r a n e t A d v i s o r • D a n i e l B l u m

Exchange doesn't have a lock on messaging market

It used to be said that you can't get fired for buying IBM. Today, Microsoft is perceived by many users as the safe choice. In fact, some companies using Notes, GroupWise or other products have begun asking for a risk analysis of *not* using Microsoft Exchange.

Right now, Microsoft has the momentum in messaging. Exchange and its Outlook client are moving into their second year as shipping products, and deployments are ramping up. It will be an anxious time for users who have bet on other products, but winning the battle this year doesn't mean Microsoft has won the war.

Various Internet and intranet groupware and workflow products have significant advantages over Exchange in many areas and will

continue to offer enhancements, Java-based and otherwise. Notes/Domino represents a major part of IBM's desktop presence and middleware — the glue between desktop, workgroup and enterprise offerings. IBM cannot afford to lose Notes/Domino and will defend the product at all costs.

Most scenarios we've plotted show Notes/Domino leading Exchange in installed base through the end of 1999. As Lotus' cc:Mail and Microsoft Mail did in the early to mid-1990s, Notes and Exchange

will stay on par with each other over the next few years, with other key vendors such as Netscape and Novell still very much in the picture.

But to say you have to pick Exchange just because it's doing a great job of catching up is a lot of hogwash caused by fear, uncertainty and doubt (FUD).

Sure, it makes sense to look seriously at Outlook and Exchange if you're standardizing on Windows 32-bit desktops and NT servers. Even if you haven't standardized on a Microsoft infrastructure, you should look closely into doing so, especially once NT 5.0 is in production in 1998 and can actually be compared with IntranetWare and other intranet network operating systems.

Even if you're going with a Microsoft infrastructure, consider other alternatives for messaging. True, Microsoft always will have about a six-month lead over competitors on Microsoft Office and NT server integration features for Outlook and Exchange.

But balance that against the risks of putting all your eggs in Micro-

soft's basket, losing your negotiating leverage and seeing mission-critical initiatives become overly dependent on Redmond's development schedule and product packaging whims.

Screen out the FUD from the real business and technical issues. Whatever the messaging vendor, expect quality products, volume discounts, references and responsive product support. Large customers also should demand a customized, up-front design architecture and deployment plan. You can save money by making vendors such as Lotus, Microsoft, Netscape and Novell earn your business.

Don't underestimate migration issues. Major vendors offer mailbox extractors for their competitors' environments, but not all of them are enterprise-ready. For example, after testing, one customer estimated it would take 300 staff days to move fewer than 3,000 GroupWise mailboxes to Exchange using Microsoft's GroupWise migration wizard.

Next, look at the training costs and productivity impact of migration in your environment.

Remember that Internet and intranet standards are your best line of defense against vendor lock-in, and keep emphasizing them in your architecture, procurement and deployment decisions. Once the major vendors finish building support for propagated standards into their clients and servers, migration gets much easier.

You can always switch products later if you have to. It's still a buyer's market.

Blum is a principal at Rapport Communication and can be reached at dblum@mindspring.com or www.rapport.com. Call (800) 643-4668 for details about his Next Generation Messaging seminar, sponsored by Network World and Rapport Communication.



Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.

Directory assistance

In his column "The directory debate continues" (June 9, page 22), Dave Kearns criticizes Netscape for syncing directories with NT rather than allowing for a single directory.

Granted, this is not an optimal solution. However, the single-directory notion is at odds with the whole idea behind the Lightweight Directory Access Protocol (LDAP): directory interoperability. The last thing users need is another center-of-the-universe directory service.

If everyone writes to the LDAP standard, then users can pick directories and applications based on features and



You, too, can become your own carrier

A few months ago, The Yankee Group discovered a loophole in the Telecommunications Act of 1996 that would allow a company or nonprofit organization to file as an enterprise local exchange carrier (ELEC) — a special form of competitive local exchange carrier (CLEC). We pontificated that a large organization could have just one company — itself — as a customer.

This loophole obviously was never anticipated by the FCC. But it is there and will be exploited by smart users, large nonprofits and electric utilities.

An ELEC could file for CLEC status in its home state for as little as \$15,000 to \$25,000. Furthermore, the ELEC could break even — or even make money — if its bill for access, local and long-distance service was as little as \$8 million to \$9 million per year.

Former Federal Communications Commission Chairman Dick Wiley has blessed the idea, saying, "This is exactly the sort of innovation that the FCC had in mind." The major long-distance carriers think it's a peachy idea — for those areas where they're not filing for CLEC status.

The local exchange carriers think it's a marvelous idea — for those areas where they're not the incumbent LEC. And equipment providers such as Lucent, Nortel, ADC Kentrox and Ericsson think it's an absolutely fabulous idea — as long as they don't have to provide the financing.

Users? The biggest ones want to shut us up — and quickly. Why? Because they're already in the middle of negotiating special deals as if they were ELEC — or filing for CLEC status. For years, they have been quietly receiving payments for their originating traffic when they bypass the local carriers, and they don't want these loopholes exposed.

Obviously, if you are a large enough telecom user, you want to be treated as a cocarrier rather than a customer. Incoming calls? Love 'em! Please remit me my portion of the access fees. Ditto with Internet traffic.

A lot of companies, however, think that offering ELEC or CLEC service would bring them under FCC control and be too expensive to monitor and build. But new FCC rules say only that you must have a switch (now as low as \$250,000 for a thin switch), offer 911 service (easy) and provide billing (no problem).

Furthermore, you can set prices so you don't get the type of customers you don't want, such as pushy residential customers who complain about their bills.

There are 5,000 organizations in the U.S. that have more than 2,500 employees and should evaluate becoming an ELEC — perhaps as many as 250 of them will make the move.

In the meantime, who's marching right into this space? The electric utilities. There are 3,200 electric utilities in the U.S., the top 15 of which are hell-bent on becoming ELECs.

The irony is that before there was a \$190 billion communications market, there was an electric utility market so powerful Congress passed the Public Utility Holding Company Act of 1935 so these companies wouldn't crush the communications industry!

It's also ironic that the telecom act gives the electric utilities special rights that remove a substantial amount of the risk associated with becoming an ELEC. Under the act, electric utilities can go right to incumbent LECs for services they don't want to provide themselves just yet — such as operator services, signaling and billing. Incumbents have to sell them these services at only a little over cost.

Further, interchange carriers (IXC) always will offer to sell long-distance service to electric utilities at wholesale prices, even though, on principle, they hate all resellers. Business is business, and those carriers with excess capacity (all of them) will cut deals with ELECs.

The electric utilities will pass through three stages on their way to becoming ELECs. First, they will become lean internal providers to themselves — meaning they will build out their systems with the idea that standards such as Telecommunications Management Network now make great sense. Then they will passively provide dark fiber along their rights of way. Finally, they will enter the business as special ELECs in markets such as the home office and small business sectors.

Now suppose your local university likes the idea that it can receive revenue from incoming calls and Internet traffic. The university can have the electric utility build and run a system for it, allowing the university to make money not only on incoming calls, but also on outbound local and long-distance calls. Nice work if you can get it.

At issue: What will the size of the CLEC industry be? Right now, CLEC market share is small, but history shows us that a focused attacker picks up market share more easily than a defender can retain it. Furthermore, the market grows as more competitors enter.

Will the incumbent LECs sell to the ELECs? They have to, especially if they are going to be allowed into that \$75 billion long-distance market. Will the regional Bell operating companies and IXCs help get the CLECs going? Yes, but with some reluctance.

And who will provide the financing? Companies such as GE Capital. It was originally set up by Thomas Edison to help electric utilities buy his transmission and distribution equipment and is now determined to finance the re-wiring of America — by those same utilities.

Anderson is founder and president of The Yankee Group, a Boston-based consultancy. He can be reached at (617) 956-5000 or via the Internet at handerson@yankeegroup.com.

performance, rather than getting locked into a particular vendor's products. This is a goal of organizations such as the Network Applications Consortium (www.netapps.org), which works toward improving interoperability of networked applications.

Regarding Banyan support for LDAP: Yes, it lagged for the StreetTalk products, but it will get there. However, Switchboard, which is based on StreetTalk, has been LDAP-enabled for quite some time.

As for Banyan pricing, the true cost of ownership of any technology is not the up-front price, it's the operational cost (often referred to as cost of ownership). Also, in today's market, pricing often is negotiated case by case. Therefore, using the retail price as a basis for determining the value of the directory is irrelevant.

I respect Kearns' opinion and am not trying to change his rec-

ommendation that readers get the early access version of Novell's NDS for NT and test it thoroughly. To make any decision on directory services, users really need to apply their business needs to the technology and see what works for them.

*David Rusting
Network manager
University of Michigan
Ann Arbor*

Go online to read
more letters to
the editor.

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Show me the money

Regarding Mark Gibbs' column (June 23, page 78) on Christian Orellana, the Danish consultant who found a security bug in Netscape's browser:

While philanthropy is noble, most people — and certainly businesses — like to be paid for their work. Orellana states that he thought his information was worth more than Netscape's token \$1,000, and while it would have been nice if he'd just wanted to help out, I must agree with his premise.

How much is Netscape's good name worth in this competitive environment? How much is their users' data worth or the possibility of a lawsuit? What if Orellana had contacted Microsoft with the information instead? From what I've read of the incident, Netscape was able to locate and fix the bug only with the help of cache files from Orellana's demonstration to the press.

I like to think I wouldn't have asked for more from Netscape, but all things considered, I don't think I can find fault with Orellana.

*Jack Smith
Minneapolis*

Orellana had the right idea, but the wrong company. If he's that good, he ought to spend some time with Microsoft's

browser.

Even at just \$1,000 per bug, he'd be a rich man!

*Brian Hertziger
Owner
Mr. Homies' Computex
Milwaukee*

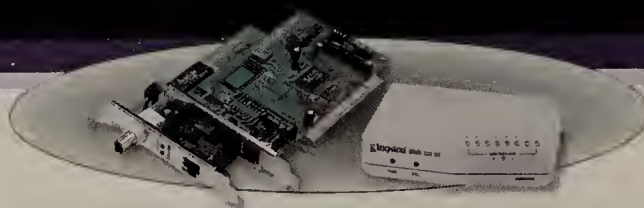
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DESTINATION: INTERNET

By Edwin E. Mier, Robert J. Smithers Jr. and Thomas R. Scavo

With everyone clamoring about the Internet these days, the ability to easily and efficiently deliver Internet access has become a key criteria when buying a router. That's why we chose to focus the hands-on testing portion of this Access Router Buyer's Guide around Internet capabilities.

We brought seven routers into the lab and evaluated them for performance, manageability and other features that are crucial in a remote office. How did they rate? **The Scorecard at the bottom of the page** will give you a quick summary, while the **review beginning below** has all the details.

Naturally, we couldn't bring every available access router into

the lab, but we did round up the products that best represent each vendor's access router line for the **product chart** that begins on **page 45**.

If the model on your short list isn't in the chart, don't despair. Turn to **Network World Fusion** (at www.nwfusion.com) for an expanded version of the chart. While online, use our **Interactive Buyer's Guide**, which helps you find products based on the mix of buying criteria you select.

What criteria should you focus on? Price seems to be No. 1 in this segment of the marketplace. For **advice** on what else to look for, see the story on **page 44**.

Three products rise to the top in our tests of top Internet access routers.

Given that many companies are willing to shell out \$500 to \$1,000 per month for a high-speed, dedicated link to the Internet, the question becomes which router to use. Three of the seven contenders we tested pulled away from the pack, led by Bay Networks, Inc.'s BayStack Access Node. While high priced, it emerged as the best overall, thanks mainly to its top performance and good management capabilities.

How did we settle on this group? We interviewed several Internet service providers to learn about their network environment and to find out which access routers they encountered most often. We then compiled a short list of the router marketplace leaders, as well as a cross-section of products we wanted to test based on special or unique features they offer for Internet access. Given the now critical nature of Internet access, we also required that the router support one Ethernet LAN interface and two serial WAN ports — one for the primary T-1 connection and the other for a backup T-1 or ISDN Basic Rate Interface link.

The salient details of the seven routers we tested are shown in the chart on page 43. The top three ran neck and neck in our scorecard ratings and

Bay Networks, Inc. BayStack Access Node

Pros

- ▲ Very good Quick 2 Config utility (comes with Optivity).
- ▲ Best packet/sec throughput performance.
- ▲ LAN and serial port expansion options.

Cons

- ▼ Some bugs in Optivity traffic monitoring software.
- ▼ Optivity management package is expensive (\$3,495 for Windows).



should be considered equally proficient and capable:

- Bay's BayStack Access Node showed it was a powerhouse performer, with added capacity that can be tapped through numerous expansion options. Management is good, but to buy the full Optivity package, the price doubles to \$7,000. Still, if you've got the money, you can't go wrong with this router.
- Cisco Systems, Inc.'s Cisco 1601 is a good per-

former and comes complete with a slew of excellent management applications. If you want the best value for your router dollar, put this on your short list.

• Digital Equipment Corp.'s RouteAbout Access EI also proved to be an excellent performer. Digital may want to reconsider the pricing of its excellent clearVISN router management software, however; it costs double the price of the router.

• Osicom Technologies, Inc., formerly Cray Communications, Inc., submitted its Routermate-Plus T1. This product's low price is commensurate with its barely adequate throughput. Also, although the router supports a second serial port in the form of an ISDN BRI module, the system software does not automatically switch to the BRI link if the main T-1 channel fails.

• Livingston Enterprises, Inc. sent us its PortMaster 3 Dual T1. This router comes complete with all the software you need to make the same system a remote access server (RAS) for dial-in users, though whether a router that's used for Internet access is the best platform on which to also run your RAS system is something we question. We also question the system's \$10,000 price tag — more than double any other router hardware tested.

ScoreCard

Overall score	8.2
Management and administration (35%)	7
Performance (25%)	10
Features and functionality (20%)	7
Installation and configuration (20%)	9



Bay
8.2
7
10
7
9

Cisco
8.1
8
9
7
8

Digital
8.0
7
10
7
8

Osicom
7.1
7
8
5
8

Livingston
6.6
5
9
6
7

3Com
6.0
4
8
7
6

Ascend
5.1
4
5
7
5

Scores based on a scale of 1-10. Percentages are the weight given each category in determining overall score.

• 3Com Corp.'s OfficeConnect NETbuilder router exhibited good performance with a competitive price tag. Efficient configuration and management of this router is conspicuously absent, though. The vendor's arcane command-line interface is the only way to get into the router; 3Com's Transcend management software does not support it.

• Ascend Communications, Inc.'s Pipeline 130 included the vendor's optional Secure Access Firewall software. The impressive optional firewall was the product's strongest feature because it came with a utility that made firewall setup and configuration a snap. Throughput was disappointing, though, and conspicuously absent was any sort of Windows application for configuration and management.

Generally, our testing found some areas in which there isn't much difference between competitors' routers — most, for example, are capable of handling a busy T-1 full of Internet traffic on a sustained basis. However, there remain some key areas of difference, notably price and management.

In our File Transfer Protocol (FTP) tests, the data-transfer rate didn't vary much from router to router, except for one. For most of the routers, downloading this 8.2M-byte file took between 94 and 95 seconds, for an effective data-transfer rate of about 1.4M bit/sec. In the case of Ascend's Pipeline 130, however, the same file retrieval took 140 seconds, yielding an effective data-transfer rate of just 0.9M bit/sec.

Cisco Systems, Inc. Cisco 1601

Pros

- ▲ Nice Click Start Web-based configuration utility.
- ▲ Easy-to-use management applications, including CiscoView and CiscoWorks SNMPc.
- ▲ Optional IPX/IP gateway.

Cons

- ▼ Throughput is generally good, but management access gets sluggish under heavy WAN traffic load.
- ▼ Curved shape of router prevents units from being stacked.



Digital Equipment Corp. RouteAbout Access EI

Pros

- ▲ Good quick-configuration tool; among the easiest routers to set up.
- ▲ Very good throughput performance.
- ▲ Readily stackable, or mountable in vendor's multislot hub.
- ▲ Impressive traffic prioritization options, including time-of-day scheduling.

Cons

- ▼ LEDs are not intuitive; difficult to figure what they indicate.
- ▼ Proprietary cable used for console port; initial configuration is impossible if you lose this.
- ▼ Management software, priced at \$4,995, costs twice as much as the hardware being managed.



Bay out in front

Horsepower is not a concern with Bay's Access Node. Based on our tests, there's enough even for the optional second LAN port and optional third serial interface. The Access Node was the best performer of the routers we tested.

In addition, this router supports good traffic prioritization based on filtering rules. The user even can apply access lists to achieve a rudimentary firewall capability. Management is good with Bay's Optivity package, although we did find some annoying bugs — for example, at times the main topology map screen would inexplicably disappear.

The Quick2Config tool that comes with Bay's Optivity 6.1 Windows-based management software suite makes short work of setting up and configuring the Access Node.

The documentation is good and accurate, although eight separate manuals is a bit formidable. Fortunately, there's fairly good pop-up help in the setup software for each field that needs to be configured.

Cisco: Management included

Chances are you can buy the exact router configuration you want for Internet access from Cisco. The precise model for our topology was the 1601, which incorporates an optional second serial WAN interface.

There are several nice utilities included that make configuring this router about as straightforward and

simple as can be. Oddly, Cisco's popular Config Builder application is not supported by the 1600 series. Instead, Cisco ships a Web-based utility called Click Start for configuring this router family. What's more, Cisco also throws in, for the same low price, its CiscoWorks version of Castle Rock Computing, Inc.'s SNMPc management software.

A curious design choice is the router's curved, ovoid top surface. While this may be stylish, it also prevents you from stacking the unit.

Like Bay, Cisco employs access lists to achieve limited firewall-type filtering, but Cisco's implementation is a bit cumbersome. You also can employ Cisco's extensive prioritization features to better control traffic flow over the T-1 during times of heavy demand.

Cisco's 1601 has sufficient power to handle a busy T-1. However, we observed a little sluggishness in the router's response to management queries when it was handling a full T-1 load of traffic.

Digital: Another top performer

Digital's RouteAbout Access EI also is a powerful router, virtually on par with Bay's Access Node. In fact, the RouteAbout, like Bay's product, also can support a second LAN interface.

Digital's Quick Config utility was fast and easy to use. Digital also includes cardboard foldouts that describe configuration options for each protocol. While we were testing mainly just IP, Digital sent us its router with multiprotocol software, so we ended up with 20 different foldouts.

This router's traffic prioritization features were among the richest. You can even specify the times particular prioritization criteria apply. Also, although we used the router's second serial interface — an ISDN BRI — as a backup to the main T-1, the router can be configured to load-balance traffic over WAN links.

As with the Bay and Cisco units, you can apply filters to achieve a rudimentary form of firewall protection. Indeed, given all factors and rating criteria, we rate Digital's access router virtually on par with Bay's Access Node, at a lower price.

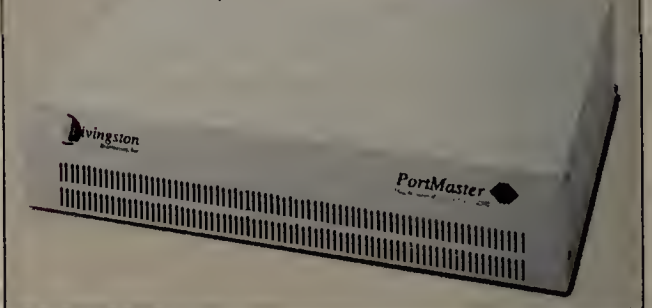
Livingston Enterprises, Inc. PortMaster 3 Dual T1

Pros

- ▲ Can be configured as a remote access server.
- ▲ Comes with a parallel port and six expansion slots.

Cons

- ▼ Priced much higher than competitive routers.
- ▼ Management software is buggy and static, requires manual refresh/update.
- ▼ Difficult to set up filters, requires tedious scripting.



Livingston: Mixing functions

When you add \$3,000 to the price tag of Livingston's PortMaster 3 router for an optional second T-1 port, you've got an Internet access router that costs \$10,000. A big part of the cost, it seems, is the functionality that's included to allow the system to act as an RAS. Six expansion slots on the chas-

Compression counts

You'll have to be careful about using different compression technologies on an Internet access link because some compression methods are not widely supported. Some, in fact, are proprietary. Any of these could boost throughput between the same vendors' routers, but they might not be much use over an Internet link, where there are different vendors' routers at each end.

We made sure that all of our simulated ISP's Cisco 7000 router's optional compression methods, including Cisco's own STAC compression, were disabled. We first tested all the access routers with their compression options disabled, too. Then we tried them with compression options enabled. For the most part, vendors' optional compression techniques didn't work with the Cisco 7000 router.

We discovered, though, that certain compression methods, such as IP header compression, are implemented compatibly by most IP router vendors by default. We found that Bay and Cisco do compatible IP header compression by default. We discovered this when the Bay Access Node router we tested — the best performing router of the bunch, it turned out — routinely achieved a throughput rate of 1.7M bit/sec — greater than the T-1 link's 1.544M bit/sec bandwidth.

Osicom Technologies, Inc. Routermate-Plus T1

Pros

- ▲ Menu-based interface makes configuration of router via console easy.
- ▲ Good event log with time stamps.
- ▲ Supports link-encryption option (requires same router configuration at the other end of WAN link).

Cons

- ▼ No backup switchover to second serial link; ISDN backup to T-1 is not supported by router software.
- ▼ Throughput performance limited, although likely adequate for most T-1 traffic loads.



sis can be equipped with modem cards and presto — you've got RAS on a T-1 router.

It may make sense in some scenarios to mix these functions, but probably not when the router is handling the organization's main Internet connection.

Even so, the PortMaster 3 is a good performer and can easily handle a full T-1 — although we don't know what effect concurrent operation of the RAS function would have on the main T-1 router.

Configuring Livingston's router is a little tougher

than some of the others: There's no quick-start guide, for example. And the vendor's Windows-based management application, PMconsole, exhibited more than a few bugs.

Osicom: Low-priced leader

For \$1,495, you wouldn't expect to get an IP router with an integral T-1 DSU/CSU. But Osicom's Routermate-Plus T1 delivers the goods and is one of the easiest to configure as well.

The menu-based console interface is about as intuitive as router configuration can be. Coupled with

the vendor's Osicom View Windows-based management application, which comes atop Castle Rock's SNMPc management application, this router package scores well in ease of use.

Now the bad news. Osicom's router technically failed to meet the entrance criteria for this test series. While a slot for a second serial port and an ISDN BRI module for this slot are supported, the system software doesn't yet handle the automatic backup of the main T-1 link by the ISDN BRI link. This software capability is scheduled to ship in the fall, the vendor says.

The Routermate-Plus T1 has enough horsepower to handle most T-1 traffic loads, as long as there is a mix of big and small packets headed in both directions. However, the router didn't quite keep up with a T-1 full of minimum-sized (64-byte) packets.

We observed no slowdown in the router's responsiveness to management queries under heavy T-1 link load, even though router throughput on the T-1 was topped out. The router is apparently built with a clean division of processor resources between routing and management.

3Com: Cryptic command line

3Com's OfficeConnect NETbuilder router costs only \$500 more than the lowest priced entrant, Osicom's Routermate-Plus T1 and, like that router, contains an integral T-1 DSU/CSU. Although the OfficeConnect NETbuilder's performance is generally good, configuring and managing the router is troublesome.

Because the router is not supported by 3Com's

3Com Corp. OfficeConnect NETbuilder Model 142U

Pros

- ▲ Comes with built-in firewall functionality; provides packet-level filtering.
- ▲ Supports several methods for prioritizing traffic over WAN link.
- ▲ Practical design; easily stacked.

Cons

- ▼ Management access and data accuracy degrades somewhat under heavy WAN traffic load.
- ▼ No Windows-based management software; command-line interface is arcane.

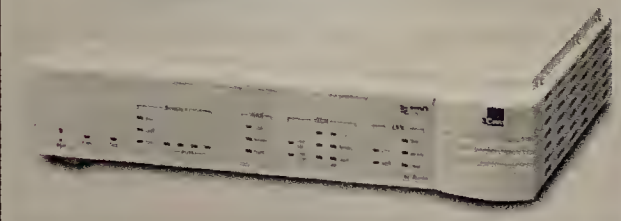


TABLE 1: CONFIGURATION AND TESTING HIGHLIGHTS

Vendor	Bay	Cisco	Digital	Osicom	Livingston	3Com	Ascend
Product	BayStack Access Node	Cisco 1601	RouteAbout Access EI	Routermate-Plus T1	PortMaster 3 Dual T1	OfficeConnect NETbuilder Model 142U	Pipeline 130
Price as tested	\$3,495	\$1,895	\$2,900	\$1,495	\$9,950	\$1,995	\$2,995
Does price as tested include integral T-1 DSU/CSU?	No, external Adtran TSU LT was used in testing (add \$895)	No, external Adtran TSU LT was used in testing (add \$895)	Yes	Yes	Yes	No, external Adtran TSU LT was used in testing (add \$895)	Yes
Options included with configuration tested	IP Access Suite software (\$850)	Optional card for second serial T-1 WAN port (\$400)	Multiprotocol software (\$400 more than IP-only)	None	Second T-1 (\$3,000); remote access server function is inherent	None	Secure Access Firewall (\$1,000)
Expansion options	Third sync port (\$300); second Ethernet port (\$500)	Other models for ISDN and various other configurations	None	None	Six slots for modem cards (for remote access server feature)	None	None
Interfaces	1 Ethernet, 2 serial sync	1 Ethernet, 2 serial sync	1 Ethernet, 1 WAN sync, 1 ISDN BRI	1 Ethernet, 1 WAN sync, 1 ISDN BRI	1 Ethernet, 2 WAN sync	1 Ethernet, 1 WAN sync, 1 ISDN BRI	1 Ethernet, 2 WAN sync
Sync port speeds supported	Up to E-1 (2.048M bit/sec)	56K bit/sec to E-1	Up to T-1 (1.544M bit/sec)	Up to T-1	Up to E-1	Up to E-1	Up to T-1
Notable options not included in configuration tested	Token-ring models, Ethernet RMON data collector (\$1,195), ISDN BRI (\$500), integral 56K/64K bit/sec DSU/CSU (\$350)	Novell's IPeXchange IPX-to-IP gateway software	ClearVISN 1.1 router manager (\$4,995)	Out-of-band SNMP management (\$295); encryption card (\$595)	Offers the IRX Firewall Router, a different product	Full protocol software (\$1,000); base router includes IP and IPX support	None
Windows-based management software	Quick 2 Config included; optional Site Manager (\$200) and Optivity 6.1 (\$3,495)	Web-based Click Start and CiscoWorks SNMPc for Windows 2.1 included	None	Osicom View 1.0 with SNMPc (\$1,595)	PMconsole 3.5 included	None; configured and managed via command-line console interface	None; configured and managed via command-line console interface
WAN link protocols supported	PPP, frame relay, ISDN, BRI, async dial, HDLC/LAPB	PPP, frame relay, HDLC	PPP, frame relay, X.25, others	PPP, frame relay	PPP, frame relay, ISDN PRI, HDLC	PPP, frame relay, ISDN, async tunneling	PPP, frame relay, ISDN
Tallorable traffic prioritization	Yes	Yes, extensive	Yes, impressive	No	No	Yes	No
Maximum unidirectional packet/sec throughput over T-1	3,325	2,330	3,300	1,600	2,270	2,360	500
Effects of heavy WAN traffic load on management access	None (inaccuracies found in Optivity not related to traffic load)	Slow ping response (via LAN), but SNMP reliable and accurate	None; SNMP remains reliable and accurate	None observed	None observed	Telnet degrades slightly; SNMP becomes inaccurate	Slow ping response; SNMP timeout; telnet session fails

Ascend Communications, Inc.

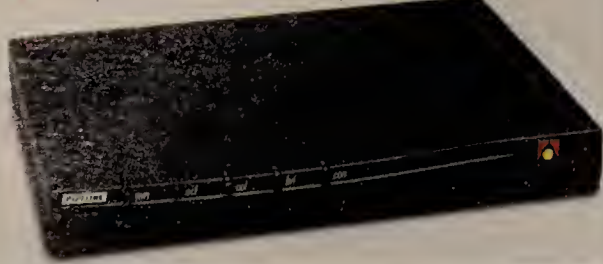
Pipeline 130

Pros

- ▲ Very small footprint; readily stackable.
- ▲ Configuration utility for the optional firewall makes firewall setup a snap.

Cons

- ▼ Router configuration is arduous.
- ▼ No Windows-based management application or configuration tool.
- ▼ Poor performance with small packet sizes.



Transcend suite of management software, you must turn to the command line to set up and access the system. And 3Com's router command line is particularly inscrutable.

There are, however, some impressive, advanced features built into the router — filtering options and

traffic prioritization capabilities, for example.

There is a CD-ROM with searchable documentation, but using it takes time and patience. There also is an Easy Step guide for configuring the router, but even using this guide — akin to a subway map — is overly complex.

The 3Com router was a good performer as far as keeping the T-1 link filled. However, we noted some sluggishness in the router's response to management when it was handling a busy T-1.

Ascending to the 'Net

You have to telnet into Ascend's Pipeline 130 router or use a local console to configure or manage it, and doing so is not easy for newcomers. Ascend offers a "quick configurator" application for some of its router products, but it's not yet available with the Pipeline 130.

There's some on-screen help available via the console interface, and there are some autodetection features on the serial WAN ports. The vendor's documentation is pretty clear and concise — and is searchable via the CD-ROM that comes with the product. Still, without a Windows graphical user interface-based management application, Ascend lags behind leading competitors Bay, Cisco and Digital.

Our most notable finding with the Pipeline 130 is its limited throughput. Though the router is not optimized for the minimum-sized packets that we used in one throughput test, it also choked on our FTP retrieval test. We thought the optional firewall software may have been partly responsible for throttling the router's throughput. Ascend included the firewall feature for our evaluation, and we found it a very useful feature to include with an Internet access router. But Ascend's technical staff assured us that running the firewall software does not inhibit throughput.

The vendor speculated that an obscure compression setting may have impacted performance. However, we tested the unit with the same default settings that most users would likely employ. The bottom line: If performance is a primary concern for you, this router model will have a hard time keeping up with a heavily loaded T-1 link without tweaking and tuning.

Mier is president, Smithers is manager of lab testing and Scavo is a systems integrator assigned to lab testing for Mier Communications, Inc., a network consultancy and product test center based in Princeton Junction, N.J. They can be reached at (609) 275-7311, or via the Internet at ed@mier.com, rob@mier.com or tom@mier.com.

Key router selection criteria: Price, simplicity, security

By Amy Schurr

When it comes to selecting a low-end access router, the choice usually comes down to the product that leaves the most cash in buyers' wallets.

To make a user's short list, a router naturally has to handle the right protocols and offer acceptable throughput. But when decision time comes, most router buyers cite price as the single most important product differentiator, according to Tom Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J.

"The reason why the low end is the low end is because of price sensitivity," Nolle says. "A branch office router has a minimal amount of function to perform, and the simplicity of features dictated by the devices makes it very hard to promote feature differentiation."

To say you'll find a wide range of prices and features to choose from would be a gross understatement. We asked vendors to send us information on routers that cost \$5,000 or less and are designed for small campus environments and remote or regional offices. Response was so great, we had to limit each vendor to one product for inclusion in the Buyer's Guide chart on page 45. Fortunately, there are no space constraints online, so you'll find dozens more products and an expanded features list online in the Network World Fusion chart.

Which product should you choose? Like any other networking hardware investment, it all depends on what you need and how much you're willing to spend.

Denise Barton, director of Internet infrastructure for the Dell'Oro Group consultancy in Portola Valley, Calif., divides routers into several classifications, including high-end, midrange, low-end or branch and Small Office/Home Office (SOHO). The products represented in the chart are primarily branch and SOHO routers.

The Dell'Oro Group defines low-end or branch routers as those used to connect small branch offices to corporate or divisional headquarters via leased-line, dedicated WAN links. Most of the products are Layer 3 fixed configuration devices that have between one and two LAN ports and one and two serial WAN ports. The routers also may sport asynchronous or ISDN dial-up ports.

Products in this category include Advanced Computer Communications, Inc.'s (ACC) Colorado, Danube and Nile; Bay Networks, Inc.'s Nautica Marlin; Cisco Systems, Inc.'s 2500 series; Digital Equipment Corp.'s RouteAbout Access series; and OpenROUTE Networks, Inc.'s GlobeTrotter 60 and GlobeTrotter 100 series, among others.

SOHO routers account for the fastest growing segment of the market because of small offices going online and the increasing popularity of telecommuting. The devices connect SOHO sites to corporate or divisional headquarters, each other or the Internet using an ISDN Basic Rate Interface or asynchronous port dial-up line. Most are fixed-configu-

ration Layer 3 devices that typically have no more than one LAN port, one ISDN BRI port and/or an asynchronous port, Barton says.

ACC's Congo; Ascend Communications, Inc.'s Pipeline 75; Bay's Nautica CLAM; Cisco's 700 series; OpenROUTE's GlobeTrotter 70 series; Shiva Corp.'s AccessPort; and 3Com/U.S. Robotic's LANLinker BRI all meet this criteria.

Ease of installation and setup are key factors to consider when evaluating a low-end or SOHO router, Barton says. "Installation is typically up to the individual in the home or remote office, not IS," she says. Network managers usually assume responsibility for administering the device and downloading updates, but users need to be able to get the routers up and running in the beginning. Web-based management and remote monitoring tools are other useful features.

Look for PPP routing and SNMP support, both of which the majority of products have, and ensure that your central site device and remote box are compatible, Barton says. For this reason, most IS managers prefer to buy both products from the same vendor, which also eases network management.

And don't underestimate the importance of security. Pick a router that supports a common security protocol like Password Authentication Protocol or Challenge Handshake Authentication Protocol. If you're using a dial-up line, consider a product that offers access control lists, as do roughly half of the products in the chart. Dial-back capabilities also offer extra protection.

Dynamic IP addressing offers convenience and helps ease router configuration and management, while IPX spoofing is important for traffic containment. If you use ISDN, you may appreciate the cost-effectiveness of a plain old telephone service port that lets you run voice or fax over the second B channel while the router carries data. ■

Network World Fusion is a must-stop for more access router product information:

- Want even more product information? We've got the expanded Buyer's Guide online — with more than twice the access routers listed here.

- The Interactive Buyer's Guide: You pick the features that are most important to you, and we search our database to find the products that best meet your needs.

- How we did it: Check out the parameters we used for our router testing.



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BUYER'S GUIDE: ACCESS ROUTERS

Company	Product	Maximum number of ports												SNA support	Throughput	Features								Price																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
		Total LAN		Total WAN		Ethernet 10M bit/sec		Ethernet 100M bit/sec		4M/16M bit/sec token ring		Frame relay: 56K/64K bit/sec		Frame relay: Fractional T-1		Frame relay: T-1		ISDN: BRI		ISDN: PRI		Dial-up line		Analog leased line		Digital leased line																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

Products highlighted in color were tested. • Blue Ribbon winner. • Editor's Note: Each vendor was limited to one product. Look on Fusion for a more expansive list of access router products and features.

Footnotes: (1) Greater with compression depending on data (2) Varies depending on configuration (3) Server-based solution; separate NIC provides interface (4) Vendor did not supply information. (5) Up to two per chassis; connect multiple units for larger net nodes
(6) 512K bit/sec with compression (7) Dependent on hardware (8) With compression APPN = Advanced Peer-to-Peer Networking DLSw = Data Link Switching
LLC = Logical Link Control NA = Not applicable SDLC = Synchronous Data Link Control

CHART COMPILED BY KATHY SCOTT

BUYER'S GUIDE: ACCESS ROUTERS

Vendor	Product	Maximum number of ports												SNA support	Throughput	Features								Price											
		Total LAN		Total WAN		Ethernet 10M bit/sec		Ethernet 100M bit/sec		4M/16M bit/sec token ring		Frame relay: 56K/64K bit/sec		Frame relay: Fractional T-1		Frame relay: T-1		ISDN: BRI	ISDN: PRI	Dial-up line	Analog leased line	Digital leased line		(In bit/sec)	Data compression	Inverse multiplexing	Protocols routed	RMON	SNMP	Access control list	Encapsulation	Encryption	Packet filtering	(Min.-max.)	
Hughes Network Systems, Inc. (888) 444-4170 www.hns.com	RX50 Version 4.0	2	3	1	1							3	3	3								3	3	LLC conversion, SDLC pass-through, other	4.8M	•		IP, SNA	•	•	•			\$2,950-\$5,450	
Hypercom Network Systems, Inc. (800) 577-5501 www.hypercom.com/netsys	IEN 2000	(5)	(5)	2	2							2	2	2	4	2	4	4	2			2	2	APPN, LLC conversion, SDLC pass-through	344M (bus architecture)	•	•	AppleTalk, DECnet, IP, IPX, SNA	•	•	•	•		\$2,300-\$6,000	
IBM (800) 426-2255 www.ibm.com	2210 Multiprotocol Router, Multiprotocol Routing Services 1	2	12	2	2							12		12	4	1	12	12	12			12	12	APPN, DLSw, LLC conversion, SDLC pass-through, other	7.68M	•	•	AppleTalk, VINES, CLNP, DECnet, IP, IPX, SNA, other	•		•	•	•	\$1,150-\$4,500	
Intel Corp. (503) 696-8080 www.intel.com	Express Router 9x00 Family Firmware 2.21	1	2	1								2		2				1				2			3M	•		IP, IPX	•		•	•		\$1,299-\$1,597	
ISDNet, Networking Division of Alpha Telecom (408) 260-3080 www.isdnnet.com	NetRouter 1040 Version 2.02	4	1	4												1									128K (6)	•		IP, IPX	•		•		•	\$995	
Lantronix (714) 453-3990 www.lantronix.com	LRS16	1	16	1											16						16	16	16		14.88K			AppleTalk, IP, IPX	•		•	•	•	\$2,495	
Livingston Enterprises, Inc. (800) 458-9966 www.livingston.com	PortMaster 3	1	3	1								2	2			2	1					2			4.211M	•	•	IP, IPX	•		•	•	•	•	\$4,500-\$6,400
Motorola, Inc. (508) 261-4000 www.mot.com/isg	6520 MPRouter platform 5.0	2	19	2	1							19	19	19	8		19					19		LLC conversion, SDLC pass-through, other	1.5M	•		AppleTalk, DECnet, IP, IPX, SNA	•		•			\$2,995-\$16,000	
Novell, Inc. (800) 453-1267 www.novell.com	NetWare MultiProtocol Router 3.1	(7)	(7)	(7)	(7)	(7)						(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)		DLSw, LLC conversion	3M (8)	•		AppleTalk, IP, IPX, SNA, other	•		•	•	•	\$895-\$3,485	
OpenRoute Networks, Inc. (508) 898-2800 www.openroute.com	GlobeTrotter GT60 Version 3.0	1	1	1								1	1	1			1	1	1			1			3.072M	•		IP	•		•	•	•	\$795	
Osicom Technologies, Inc. (888) 674-2668 www.osicom.com	RouterMate Plus-T1 Version 2.0	1	1	1								1	1									1		NA	1.536M			IP, IPX	•		•			\$1,495	
SBE, Inc. (800) 214-4723 www.sbei.com	netXpand SoHo 3.0	1	4	1											4		4	2	2						2.048M	•	•	IP, IPX	•		•		•	\$1,375	
Shiva Corp. (800) 977-4482 www.shiva.com	AccessPort 1.5	1	1	1											1		1								128K (6)	•	•	IP, IPX	•		•	•		\$795-\$995	
Symplex Communications Corp. (313) 995-1555 www.symplex.com	DirectRoute DR-1/BRI 4.0600	1	6	1								2	2	2	4							2			2M	•	•	IP, IPX, other	•		•	•	•	\$2,999-\$3,799	
3Com Corp. (800) 638-3266 www.3com.com	OfficeConnect NetBuilder	1	2	1								2	2	2	1							2		APPN, DLSw, SDLC pass-through, other	Line speed	•	(4)	AppleTalk, VINES, DECnet, IP, IPX, SNA, XNS, other	•		•		•	\$895-\$2,995	
U.S. Robotics (800) 877-2677 www.usr.com	LANLinker BRI 1.1	1	1	1											1										612K (8)	•		AppleTalk, IP, IPX, other	•		•		•	\$795	
Xyplex Networks (800) 338-5316 www.xyplex.com	Network 3000 Branch Office Router	1	4	12								4	4	4	2		16	16	4						7.618M	•	•	AppleTalk, DECnet, IP, IPX	•	•	•	•	•	\$1,995-\$4,995	
ZyXel Communications, Inc. (714) 693-0808 www.zyxel.com	Prestige Series (100, 128, 2864l)	2	1	1											1										128K	•	•	IP, IPX	•		•		•	\$599-\$1,099	

Products highlighted in color were tested. • Blue Ribbon winner. • Editor's Note: Each vendor was limited to one product. Look on Fusion for a more expansive list of access router products and features.

CHART COMPILED BY KATHY SCOTT

Footnotes: (1) Greater with compression depending on data (2) Varies depending on configuration (3) Server-based solution; separate NIC provides interface (4) Vendor did not supply information. (5) Up to two per chassis; connect multiple units for larger net nodes
(6) 512K bit/sec with compression (7) Dependent on hardware (8) With compression APPN - Advanced Peer-to-Peer Networking DLSw - Data Link Switching
LLC - Logical Link Control NA - Not applicable SDLC - Synchronous Data Link Control

Management Strategies

Covering: Budgeting, Staffing and Career Planning

Briefs

■ **The Incoming Call Center Management Conference** will be held **August 25 to 28** in Denver.

First up is a miniconference called *Call Centers on the Internet*. The daylong event hosts sessions on integrating Web pages into call centers and fax into call center Web sites. A keynote on the strategic repositioning of the call center, case studies, an Internet progress report and an open forum round out the information set.

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■ **Gartner Group Learning** has added Prosoft I-Net Solutions, Inc.'s **instructor-led Internet/intranet training courses** to its computer-based training, video, online and multimedia curriculum. Gartner clients can now take courses at any of Prosoft's 45 U.S. training sites. Alternate delivery sites also are available.

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Hop on the Internet to rejuvenate your career

Increase your visibility and demonstrate your know-how in online discussion groups and mailing lists.

By Daniel Dern

Participating in Internet mailing lists and Usenet discussion groups is not only a good way to keep up with network issues, it also can be helpful—even essential—for furthering your career.

One of the best definitions of the Internet was coined years ago on the COM-PRIV mailing list as “the community of a million conversations.” Indeed, the Internet is home to tens of thousands of publicly accessible mailing lists, Usenet newsgroups, chat groups and countless private mailing lists.

MIDS is looking for a systems administrator on the 'Net via various job newsgroups and mailing lists in addition to a posting on its corporate Website.

“There’s no question that online participation helps me in my career,” says Ben Littauer, president and CEO at Baranof Software, Inc., an e-mail and Internet management software vendor in Watertown, Mass.

Littauer says he benefits from lurking on lists because he hears about lots of issues pertaining to various technologies, which gives him a large store of data to

tap when a question arises. For instance, he can respond, “Oh yeah, I heard Product X has that problem. Let’s not use it in that way.”

“Without this information source, the technology decisions I make would be harder, and I would have less confidence in them. Further, when I participate in online discussions, I get the opportunity to promote not only our products, but also the entire market in which my company plays, and this has direct and tangible benefits,” Littauer says.

Online discussions also get seen by people who may be able to help you down the road.

“If you identify appropriate lists, you gain visibility with other people in your company and other companies that may be interested in hiring you,” says Lee Levitt, director of technical marketing at messaging vendor Software.com, Inc. in Santa Barbara, Calif.

“I’ve been reading and posting to mailing lists and Usenet groups for about three years,” says Tom Rowe, network administrator at the University of Wisconsin at Madison Center for Dairy Research. “I learned things about OS/2 and Warp Server that enhanced my marketability. Additionally, I made contacts that ended up getting

me invited to a meeting with some IBM executives where I was offered a job by another attendee.”

Strut your stuff

Going online also can give you opportunities to show what you can do—in a highly visible fashion. “You’re able to demonstrate knowledge ranging from technical acumen to management savvy,” says Esther Schindler, a writer, corporate trainer and longtime systems operator in Scottsdale, Ariz.

“If you’re active online in any given area, then your name will become recognizable to the technical people whom you most want to impress. In addition to increasing visibility, online participation builds your credibility because your knowledge becomes evident, she says.”

Look before you type

But online participation can be a double-edged cybersword. If you’re not familiar with the medium or the specific forum, proceed with caution.

“The danger and downside of participating in online discussions is you may become involved in flame-fests, which may result in negative visibility. And the scary thing is that once this starts, you have absolutely no control over how it goes,” Levitt says.

Public discussion postings are archived and readily searchable via engines such as AltaVista, Deja News or InfoSeek.

So remember that anything you ask or say could be located the next day or years later by your coworkers, manager or prospective employer.

Even if you’re a seasoned Internet veteran, the best way to join a new list is to start by “lurking”—reading but not posting



Go to Fusion for a guide to networking online and tips on advancing your career via speaking engagements.

—for at least two weeks.

Read through a few weeks’ worth of previous posts to get a sense of the players, what topics have been covered and the general tenor of discussions.

Similarly, respect the time of your fellow list members by making sure your postings are worthwhile.

“Note that the key word is ‘participation,’ ” Schindler says. “I’ve seen people show up in online forums, ostensibly ‘participating’ but in reality doing the electronic equivalent of shoving business cards in the face of anyone who stands still. This isn’t merely ineffective; it makes you

look like a jerk, and nobody will want to talk to you.”

Review your netiquette before you begin to post, and be sure to save a copy of any “joining” messages you send so you can unsubscribe if the list gets too busy or you get a new job and need to change your e-mail address.

Above all, enjoy the benefits of cybernetworking in moderation. Don’t get so involved that your e-mail box overwhelms you and impedes completion of the work at hand.

Dern is an author, speaker and consultant who works with business and end users to develop Internet/intranet strategies. He can be reached at ddern@world.std.com.

How to find appropriate mailing lists

While there still is no definitive guide to the Internet’s many mailing lists, the following places should get you started:

- ▶ Your Internet service provider or employer may provide pointers to popular lists-of-lists sites.
- ▶ Search AltaVista (www.altavista.digital.com), Deja News (www.dejanews.com) and Yahoo (www.yahoo.com) for subject hits on newsgroups and mailing lists.
- ▶ Liszt, the mailing list directory at www.liszt.com; the List of Lists at www.catalog.com/vivlan/Interest-group-search.html; and Publicly Accessible Mailing Lists at www.neosoft.com/internet/paml/bysubj.html.
- ▶ Use search engines to see where your colleagues post messages.
- ▶ Web sites of companies and people in your industry often have links to appropriate discussion lists and newsgroups.

Many participants have found these topical discussions invaluable for resource sharing, quick problem solving and forming and maintaining long-term friendships and business relations.

But users quickly are discovering another benefit to online interaction: It can aid career growth and help you find or get recruited for a new job.

“For certain types of jobs, such as systems administrators, the people you’re looking for will be on the ‘Net,” says John Quarterman, president of Matrix Information and Directory Services (MIDS) in Austin, Texas.

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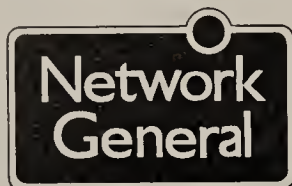
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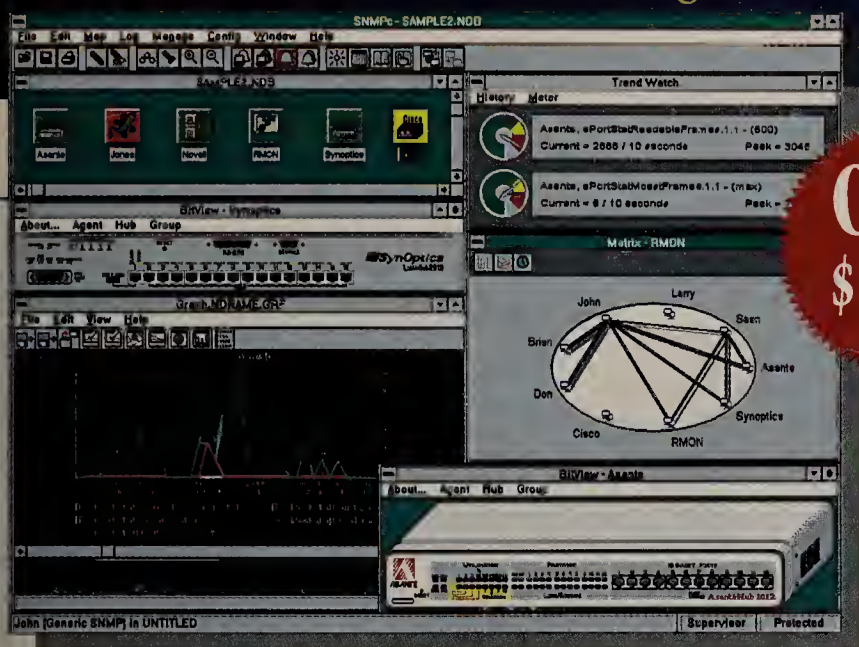
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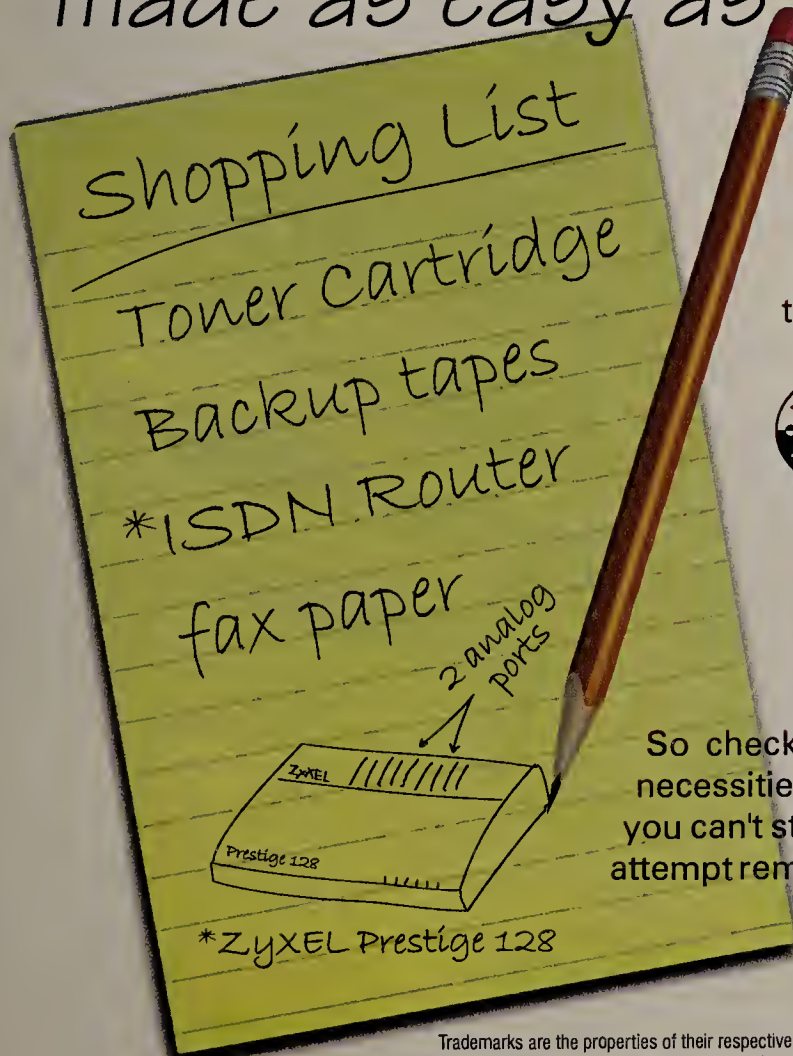
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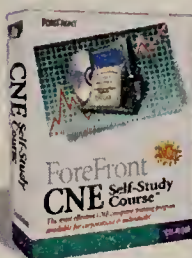
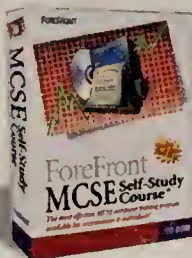


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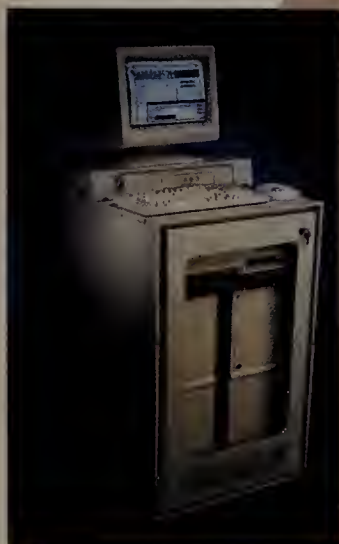
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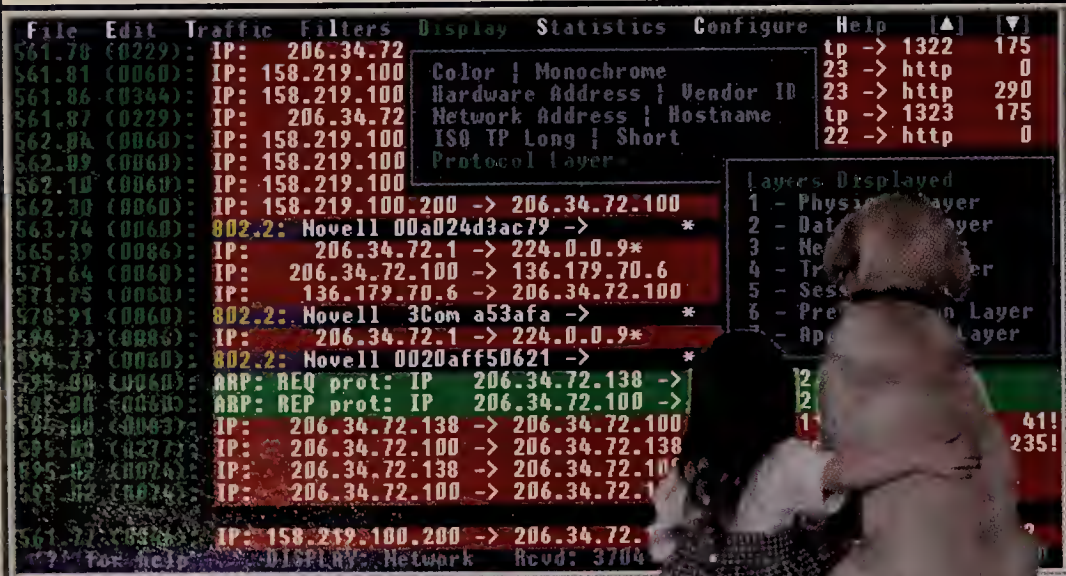
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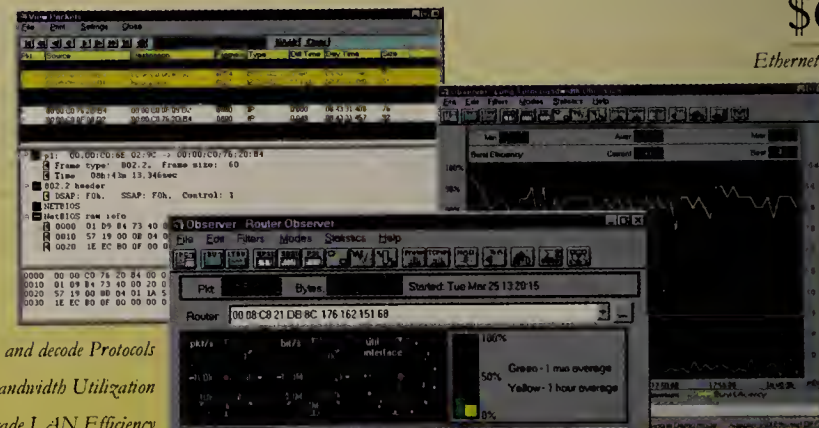
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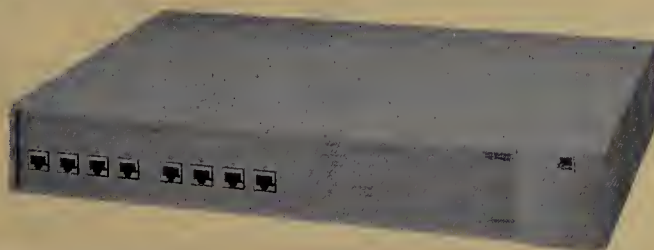
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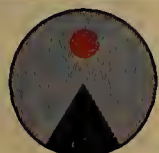
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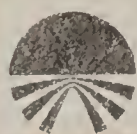
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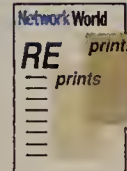
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Mars

Continued from page 1

\$600 each, according to Canada-based DataRadio Corp., which built them. (NASA actually paid about \$1,000 after minor changes.)

The transmission speed of 2400 baud is due to error-checking and other protocol overhead. The low speed is stunning when you consider end users on Earth often complain about the long waits associated with modems a dozen times faster.

The lander, which has a custom-built Motorola X-band transponder, actually beams the information to Earth about four times faster. It has a maximum speed of 11,060 bit/sec (still less than half the speed of a standard 28.8K bit/sec modem) and primarily is now set at 8K bit/sec.

So why the snail-like speeds? Simple. Lots of interference.

While Earthbound network professionals can take advantage of fiber optics and copper, NASA must beam images millions of miles through empty space. Of course, NASA uses radio frequencies designed to minimize the noise.

Moreover, power and volume are at a premium. The Mars lander has an antenna only the size of a dinner plate to focus a signal toward Earth. And it is powered by just 10 watts — “less energy than a candle on a birthday cake,” said Gordon Wood, chief engineer for mission communications at NASA’s Jet Propulsion Laboratory (JPL) here.

By contrast, NASA can rely on a network of antennas, each larger than a football field, on Earth. The parabolic reflector antennas used to receive the signal, located in Australia, Spain and the Mojave Desert in California, measure 230 feet across.

The antennas are located around the world so that the signals can be picked up no matter which way the Earth is facing. They can then be relayed on the ground to JPL. The transmitter is powered by 20,000 watts — and seems more like millions of watts after it is focused into a tight beam by a 110-foot antenna.

In all, JPL and Motorola spent about \$7 million over 21 months to develop the telecommunications system — a lot of money for corporate users but not much by NASA standards.

To cut corners, JPL tried to recycle other designs and equipment as much as possible. Originally, the telecom team planned to use spare equipment from an earlier Mars mission — until it was earmarked for yet another mission. Then JPL adapted some designs for the transmitter on the Saturn mission. And, surprisingly, JPL decided to buy off-the-shelf modems from Motorola.

After finding the Motorola UHF modems — which were originally designed for maritime

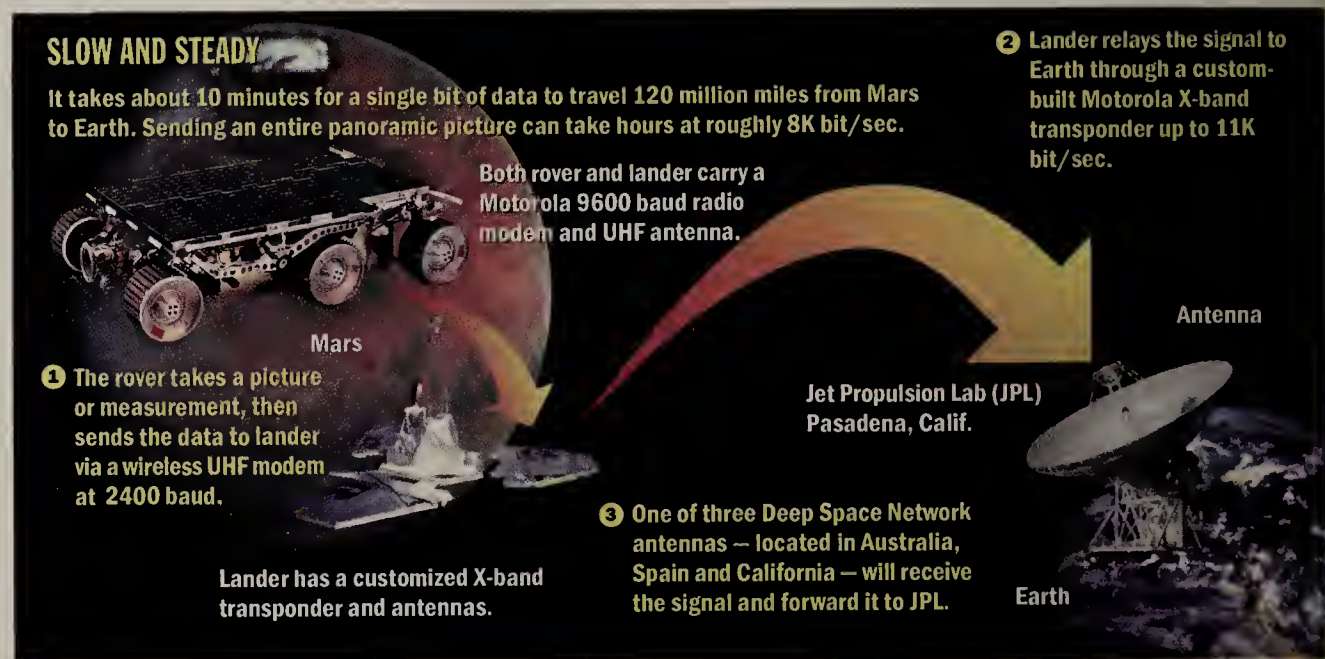
communications — JPL tried to make them more rugged. It replaced the metal casing with layers of fiberglass and aluminum tape, replaced plastic connections with wires and removed parts that were not suitable for the vacuum of space.

And because the modems were not built to operate under the extreme temperatures of Mars, JPL also placed them in a special insulated box on the rover.

But JPL designed the anten-

nas itself, including flexible “whip” antennas for the lander and rover to communicate, and two antennas for the lander to relay signals to Earth.

Considering all the possible problems, Wood said the telecommunications system has worked remarkably smoothly. When the craft landed on Mars for instance, it happened to land rightside up — making it possible to send signals immediately to Earth — something Wood called “plain luck.” ■



CapaCity

Continued from page 1

be disclosed publicly at this week’s CA-World conference here. But CA did not divulge the financial terms.

CapaCity’s NetCon automates management of PCs, including Windows 3.X, 95 and NT, MacOS and OS/2 systems. From a NetCon console, which runs under Windows or NT, an administrator can perform hardware and software inventory, asset and configuration control; software distribution and maintenance; and software metering and license management. NetCon also provides remote hard disk management,

help desk and call status reporting, remote control and troubleshooting, and Internet system management functions.

NetCon is designed for networks with dozens to thousands of PCs. The NetCon help desk module can create trouble tickets and generate alerts.

CA and CapaCity formed an alliance about a year ago to integrate NetCon with CA’s Unicenter/TNG enterprise network and systems management suite. NetCon also works with CA’s Cheyenne InocULAN virus protection software, CA said.

But CA bought CapaCity to have more control over NetCon’s development as CA looks to build a broader asset management package, according to J.P.

Corriveau, a CA marketing vice president.

“We needed to merge the capabilities of our AssetWorks [product], the power of NetCon for managing desktops and then TNG for the server stuff, into one cohesive solution,” Corriveau said. “It’s easier to do that as one product going forward vs. three individual pieces.”

Analysts reacted positively to the deal.

“[NetCon is] actually pretty good technology and something that CA’s really needed in the LAN management space,” said Herb VanHook, program director at META Group, Inc. in Stamford, Conn.

NetCon, with its Windows NT management capability, competes with Microsoft Corp.’s Systems Management Server product, VanHook said. CA and Microsoft have a broad arrangement to combine technologies, including SMS and Unicenter/TNG, but VanHook does not believe the CapaCity acquisition will sour that arrangement.

NetCon also competes with Intel Corp.’s LANdesk, Novell, Inc.’s ManageWise, Hewlett-Packard Co.’s Norton Administrator for Networks and offerings from McAfee Software.

CA plans to retain all of CapaCity’s 60 employees.

Separately, CA is expected to announce at this week’s conference new packaging for Unicenter/TNG that will enable users to purchase the core TNG

framework without bundled applications. Also, CA is expected to announce availability of a Unix-based version of Unicenter/TNG. ■

Fourelle

Continued from page 1

a Venturi server, which is a node on the corporate LAN.

The company said Venturi can double the throughput on a given access line even with the 20 to 40 msec latency introduced by Venturi’s compression/decompression actions.

Text files can be compressed by as much as 7-to-1, and mixed text and image compress 2-to-1 said Bob Smith, Fourelle president and chief technology officer.

“[Venturi] would be able to get your information faster or keep you from having to increase the size of your Internet link by increasing the efficiency of each session. This could be a big benefit,” said Jeff Banks, technical support manager for Northwest Multiple Listing Service of Kirkland, Wash. Northwest sells its members Internet access to real estate listings.

The Venturi compression scheme works on several levels,

according to Patrick Glenn, chairman and CEO of Fourelle. The compression itself can use up to seven different compression algorithms, depending on the type of file being sent.

Venturi selects the appropriate algorithms by analyzing each Net session as it transpires. Different compression algorithms may be applied by the end of an individual session to improve throughput, Glenn said.

Fourelle plans to introduce Venturi later this month at InternetWorld in Chicago.

The server comes in two models: the Venturi 100 and 200. Model 100 costs \$16,000 and has one Pentium Pro 200 processor and up to 256M bytes of memory. Model 200 costs \$26,000, has two processors and between 256M and 512M bytes of memory. Each has a 10/100-Base-T Ethernet port for attaching to the LAN. Both ship in September. Client software licenses may cost an additional amount depending on how many concurrent users the customer wants to support.

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IMAP4

Continued from page 1

shipping IMAP4-enabled products, and the Internet Mail Consortium (IMC), a vendor and user group whose members' fortunes are tied to the growth of standards-based e-mail. Two giants of the proprietary e-mail world, Microsoft Corp. and Lotus Development Corp., also have IMAP4 products in beta and have been banging their marketing drums.

IMAP4, on standards track before the Internet Engineering Task Force (IETF), is designed to give remote, mobile and nomadic e-mail users capabilities that are comparable to those found in proprietary LAN-based systems. This is not possible with today's most ubiquitous Internet e-mail access protocol, the relatively simple Post Office Protocol 3 (POP3).

For example, an end user with an IMAP4-enabled laptop e-mail program could access an IMAP4 server and download e-mail sorted by size or message ID, manipulate the messages off-line, then reconnect and have the machines resynchronize. IMAP4 also allows server-based message backup and provides security features not found in POP3.

A few facts about IMAP4

- ▶ Originally written in 1987, the updated version is filed with the Internet Engineering Task Force (IETF) as RFC 2060.
- ▶ Currently a proposed standard, IMAP4 has initial IETF approval but still must undergo draft and final review stages.
- ▶ Vendor support is increasing rapidly with Netscape's recently released Communicator among the offerings. The next versions of Microsoft Exchange and Lotus Notes and Domino are expected to follow suit.

Opinions differ widely as to whether IMAP4 is ready to roll.

"There is already a great deal of interoperability [between IMAP4 products]," said Paul Hoffman, director of the IMC, which has hosted two IMAP4 testing events. "You can assume that all of the basic features will work absolutely right, and it's only with some of the edge features that you might have some interoperability problems."

But in his tests at Emory, Murphy reported difficulties "creating, dragging and dropping folders, moving messages between folders, that sort of thing" while running disparate IMAP products.

"IMAP is an extremely flexible protocol, so it allows you to support or not support a great deal of options," Murphy added. "Every company seems to be supporting their own set of options such that clients and servers may or may not work together."

Chris Newman, a developer at Innosoft International, Inc., in West Covina, Calif., participated in the IETF workgroup that fashioned IMAP4. He said rough spots exist in early IMAP4 product implementations and even in the specification itself.

Newman said Netscape's IMAP4 client, Communicator, does not interoperate

with Innosoft's messaging software.

"Right now there are a few cross-platform [IMAP] clients, but people seem not too happy with them," Newman said. "They either don't work too well, like Netscape's, or have user interface issues. I don't think that will last too much longer because there is a lot of activity going on and a lot of promising clients out there."

Albert Gouyer, group product manager for messaging servers at Netscape, said his company's IMAP products have passed interoperability tests with a number of other IMAP vendors' offerings. He was unaware of the particular problem alleged by Innosoft.

"Our customers are turning [IMAP4] on right now," Gouyer insisted. "We're

not hearing of a lot of problems with it."

Still, some IS managers remain cautious, including Stephen Lopez, director of systems and technology at the National Board of Medical Examiners in Philadelphia.

"I'm waiting for the vendors to iron out their differences before we would even consider IMAP," Lopez said. ■

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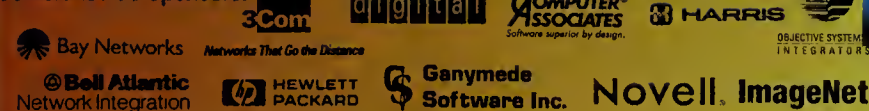
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The value of domain names: Gibbs.com up for grabs?

"A good name is better than precious ointment."

— Hebrew Bible, Ecclesiastes 7:1

"Nowadays people know the price of everything and the value of nothing."

— Oscar Wilde, "The Picture of Dorian Gray"

I've owned the domain name gibbs.com for a couple of years now. Actually, I was pretty surprised when I found out it was available. I mean, even two years ago you would have thought that getting domains based on common names would have been hard. But that was not the case, so I now have what I sometimes jokingly refer to as my vanity domain.

I get all messages sent to the domain along with a lot of e-mail from and for many people I've never heard of. As the online population has grown, people have started to use e-mail more and more, and there are lots of people who might logically be in my domain. Therefore, I have found myself responding with messages that simply say, "You have the wrong domain."

The domain many of them want is gibbsdc.com, which belongs to Gibbs Die



Mark Gibbs

The file was an archive and contained a whole suite of numerical control software for driving a computer-controlled lathe or something. The gem was a number of the files were infected with a computer virus.

The sender got a polite "wrong domain" response and a warning that he had a virus. As usual, I didn't get so much as a thank you.

But having a domain name that might be useful to others has led to other, more entertaining, messages. Last year, I had an inquiry about my domain from Gibbs and Associates, who are just down the road from me. They wanted to know if I would give the domain to them. Ha!

I asked what they thought it was worth, and they said \$1,000. I replied that they seemed to have dropped a zero or two, and our discussions ended there.

The latest request trying to acquire my domain was from some guy building a Web site for Gibbs International. His message said, in effect, that he'd been to www.gibbs.com, and other than a sparse home page and a link to another company I'm involved with, my site appeared to be nonexistent. Actually, there's a ton of stuff for my clients that is hidden. So, the inquirer wrote, "We were wondering if you would relinquish the right of the domain name to our company."

Relinquish? As in "free?" I think not.

Which leads us to the question of what is a realistic price for a domain name? A Los Angeles lawyer told me last year that his firm was handling the sale and transfer of a domain name for a price of more than \$90,000. And what would a really hip name be worth? Interestingly, a friend of mine recently got coffee.com. I would have thought that name would have been snapped up ages ago, but apparently not. I reckon that has got to be worth at least \$100,000, and he's willing to sell.

So what do you think? What is a domain name worth? Despite the fact that domain names are highly artificial, they do have significant marketing value. But is, say, \$100,000 too much or too little for coffee.com? How about for gibbs.com? How about for your company's domain name?

Your thoughts to nwcolumn@gibbs.com or lay it on me at (800) 622-1108, Ext. 504. Thought of the week: If builders built buildings the way programmers wrote programs, then the first woodpecker that came along would destroy civilization.

What is a realistic price for a domain name? And what would a really hip name be worth?

Casting. Of course, it is reasonable for people outside the company to assume that the correct domain is gibbs.com. That is, however, unfortunate for Gibbs Die Casting.

I have received communications from their suppliers, customers and friends. Most are innocuous, although I have received messages regarding what appears to be development projects and customer service issues. Just a few weeks ago, I received yet another shouted message (that is, all in CAPS) with a file attached.

<digression> Why is it that so many people still send their messages entirely in capital letters? Is it to lend weight to the contents? Is it laziness (in which case I'd expect all lower case)? Is their shift key stuck? Answers on a postcard. </digression>



'NET BUZZ

The latest on the Internet/Intranet industry

By Chris Nerney

THAT'S NOT A STOCKHOLDER, THAT'S A FEDERAL INVESTIGATOR There's an old saying in the investment community: Nothing dresses up an initial public offering (IPO) like a federal antitrust investigation.

Oops, sorry. That's actually an old saying at Network Solutions, Inc. (NSI), the domain name registrar that filed an IPO on July 3, only days after being informed it is the target of a Department of Justice probe.

The NSI offer contains several enticing elements for potential shareholders. For example, there's the likelihood NSI soon will lose its major asset — exclusive rights to the .com top-level domain. That should happen when the company's agreement with the National Science Foundation expires sometime between now and next March.

Then there's the competition, something NSI has never faced before. The Internet Society-backed plan to revamp the domain naming system may be meeting resistance, but in the end you can bet there will be more top-level domains and more domain registrars draining current and potential business from NSI.

And let's not overlook the lawsuits. NSI has been hit with a steady volley of litigation from companies alleging trademark infringement by NSI's customers and aspiring registrars challenging the NSI domain name monopoly.

This all leads to the crown jewel in the prospectus: the antitrust investigation. Even NSI admits in its IPO filing that any civil action resulting from the federal probe "could have a material adverse effect" on the company's future.

Because all shrewd investors ultimately care only about the bottom line, here's ours: Don't hold your breath waiting to buy NSI stock. There won't be any available, at least until the Justice Department investigation ends. And maybe not ever.

BUT INVESTORS CAN FEEL AT HOME HERE A couple of weeks ago we mentioned that @Home Corp. of Mountain View, Calif., would be offering stock at a date to be announced. Turns out it was sooner than we thought.

Last Friday, the developer of cable-based Internet access opened strong in its Wall Street debut, as shares surged at the bell to \$18.75, almost double the \$10.50 asking price.

NOVERA NABS SECOND ROUND OF FINANCING Java applications platform start-up Novera Software, Inc. has completed a \$4.7 million venture capital deal with several investors.

It is the second round of venture capital for the Burlington, Mass.-based company, which President and CEO Herb Rush started up in October 1995. Last year, Novera raised \$2.3 million in venture funding.

Investors in the latest round include Charles River Ventures and Matrix Partners, both based in Boston, and Sigma Partners of Menlo Park, Calif. Charles River and Matrix also participated in the initial venture round.

Novera earlier this year launched its flagship product, EPIC (Enterprise Platform Internet Computing), a network operating system written entirely in Java.

WHEN PUSH COMES TO PUSH BackWeb Technologies' acquisition last week of rival Lanacom, Inc. is the latest evidence that the push technology shakeout may be accelerating.

Toronto-based Lanacom was formed in August 1996 and launched its Headliner group of push products last December. But the company's relatively late entry into the market and failure to attract industry attention relegated it to second-tier status from which it could never escape. BackWeb's purchase of Lanacom was the second push buyout in the past two months. In June, Wayfarer Communications bought Torso, a small push software vendor in Washington, D.C.

And in March, New York-based IFusion filed for Chapter 11 bankruptcy protection, though the company's Web site still greets visitors with the confident proclamation that IFusion will revolutionize the Internet. Ah, the endless optimism of cyberspace.

Look for daily 'Net Buzz updates from Internet World in Chicago on Network World Fusion (www.nwfusion.com), July 23-25. Until then, keep that Internet and intranet news coming. Contact Chris Nerney at (508) 820-7451 or cnery@nw.com.



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